Mythopoetics

THE SYMBOLIC CONSTRUCTION
OF HUMAN IDENTITY

VOLUME II

Pathos, Logos and Mythos

Oscar E. Muñoz

Translated by the Author

Mandala Ediciones

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Mandala Ediciones
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www.mandalaediciones.com

National Library of Spain Card No. M-12859-2015

ISBN: 978-84-16316-32-8

Cover design: Reiko Iwane.

Printed by Publidisa.

To Gabriel and Alvar
With all my love.

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Mythopoetics

Oscar E. Muñoz

Preface to Volume II

This edition in three volumes of *Mythopoetics: the symbolic construction of human identity*, maintains basically the structure and contents of its Spanish counterpart. The present volume, *Pathos, Logos and Mythos*, corresponds to the second part of *Mitopoética*, though I have extended the section on rational psychology. In volume one, I defined myth as a communicative social action that generates patterns of collective identity and economic valuation from cognitive processes that follow a liminal dynamic of morphisms. Those valuations are based in emotional protocols, respond to patterns of successful survival behavior adopted by the human group. Volume II, justifies these claims.

The feedback that I have received at the conferences where I have presented some of the themes of this work made me realize that the main obstacle for the reception of a work like this is the negative connotation that the word *myth* acquired in the Western tradition after the European Enlightenment. My definition of myth extends the traditional notions, not only including elements of what has been called *logos*, but considering myth, or better, *mythical action*, as a wider process of human communication in which the identity of a group is mimetically constructed in relation to the general experience of survival. Such a definition is stated at full length in volume III, although in order to be understood requires not only the previous introduction of the conceptual tools presented in book I, Mythic Domain, but also a full theory of emotions, developed in this present volume. The reluctance to the use of the word *myth* in relation to scientific intellectual constructions, although particularly strong among Platonists and other transcendental approaches to science, is common to most *objective* ontologies. Curiously enough, this objectivity of the world, a concept deeply challenged by our present neuroscientific knowledge as well as by the epistemic constructions of quantum physics, operates socially in equivalent manner to the dogmatic assumptions of the old myths. It is impossible to see our own mythical system from the inside: no symbolical system can be defined from itself, or ascertain the truth of its sentences only with the help of its elements. This is a corollary of Tarski's theorem:[1] the truth of a symbolical system cannot be established using only the elements of that system, or in other words, a symbolical system cannot produce a semantic self-representation. The postulate is beautifully simple and intuitive, but extremely complex to apply to our own socio-psychological and epistemological valuations.

Avila, June 15th of 2015

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[1] See Alfred Tarski's, *Logic, Semantics, Metamathematics.* Trans. J.H. Woodger. Hackett Publishing Company. Indianapolis, IN. 1983. p.p 152 and s.q.

General Preface

I understand philosophical action as a dual process of axiomatic criticism and theoretical construction. When this action is applied to the symbolic constructions of our identity, I call it *mythopoetics*. For obvious reasons this book cannot but aspire to be a big-scale sketch of an epistemological map of human identity narratives, a schema which I have divided into three parts. In the first two, I define the conceptual structure which will be used in the third to develop a theory of mythical action. The first is a general introduction to the problems of mythology such as they have been dealt with from the point of view of philosophy of religion, linguistics, history, aesthetics and epistemology, merging them all into a more general concept of philosophical anthropology. The second part focuses on the definition of emotions and on the understanding of their centrality in relation to rationality and the structure of myths. From the process of the semantic emotional development of language, I construct a theory of *continuous rationality* in which animal rituals are understood as *protomyths*, and human rituals and myths as an *n-ary* symbolic development of some survival protocols. Both parts are, therefore, a discussion about the necessary conceptual elements needed to understand mythico-ritual structures, defined and dealt with in the third part, where I define the properties of interpretative mimetic actions, or mythical actions, and examine the different configurations they have taken along our symbolic development. The book concludes with an analysis of the general conditionings for the development of future mythical structures.

My ontoepistemological starting point is evolutionist, emergentist and constructivist, a stance which is better expressed by the continuous rationality theory, of Aristotelian inspiration, which assumes that vital processes display –in different stages of complexity- the property of intelligence.

Avila, July 15th 2013.
O.M.

VOLUME II

Pathos, Logos and Mythos

A. Introduction

The cosmogonies of archaic myths showed narrative scenarios which were clearly biological, and particularly, emotional. Ancestors, gods and men were represented as the actors of a great emotional drama of irate combats, of actions of reproduction and sustenance, or else, in diverse foundational actions, of human groups and cities, of pantheons, of common or wondrous habitats. Gods, men and the world were endomorphized into generative biological representations that carried our own vital order into the actions of the universe. Myths functioned as ontoepistemological and praxiological models for the community, and in this latter aspect, as absolute behavioral standards that fused emotion with action in specific scenarios. The renderings that emotions had in myths did not enjoy any autonomy in relation to their formalization into moral codes, nor did the codes have any independent meaning of the myths they were linked to. The emotion itself was interpreted as a supernatural influence, as the action of an ancestor, or a spirit, or (later) of a god, which merged with the live actor, with the social person enacting the myth, in a process that had been previously made explicit in some mythic model. The autonomy will not be attained until a distance is established between the particular cases of the mythic scenarios -whether Cosmogonic or economic-, and the idea of a universal law[2] that rules both the physical and moral dimensions of the universe, with respect to which the individual actions can distance themselves to a greater or lesser extent. Up until that time, emotions were undistinguishable from the vital mode of being, whether human or divine, and their objectification will be made possible through the ethical difference which grew with the creation of the political personae.

My emphasis on the emotional dimension of myths simply makes explicit something evident: that the largest portion of our social communications is emotional, furthermore, that the kernel of human axiologies in which the identity narratives are founded, is emotional. The radical link that emotions have with social action makes perfectly understandable that their first philosophical treatment happened within the sphere of those ethical codes grounded upon rational metaphysical psychologies which had a greater or lesser degree of transcendental emphasis. Until the appearance of 19th Century empirical psychology this was the only treatment received by emotions. This has caused that, even today, they are still considered as transcendental objects –just think for a moment about the ideas that we hold concerning the emotions of love, immortality, or freedom- with the consequential restrictions that such a treatment entails for their understanding in naturalist and anthropological frameworks.

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[2] About the genesis of myths of the universal law, see Chapter 3 of *Mythopoetics. The Symbolic Construction of Human Identity.* Volume III: Mythico-Ritual Axes. Oscar E. Muñoz. Mandala Ediciones. Madrid. (Not yet released. Publication date: 2016). (See also Complete Spanish Edition: *Mitopoética. La Construcción Simbólica de la Identidad Humana.* Mandala Ediciones. Madrid. 2013.)

I will begin this second part by exposing the limits imposed by treating emotions from the point of view of various rational-psychology doctrines, to later define the concept of emotion from the empirical perspective of affective neuroscience. I will finish postulating a thesis, based upon current neuro-scientific evidence, about the continuity of emotional and cognitive processes, the idea of a rationality that is progressively constructed from the simplest forms of life to our most complex symbolic forms, a process of semantic ascent in which the valuations of the *Lebenswelt* of our human communities are inscribed.

B. Themes

CHAPTER 1

Emotions

1.1 Emotions in Rational Psychology

The extraordinary imprecision that the term *emotion* displays in philosophical literature has only been partially dispelled after the progress of empirical psychology in the XIX Century. The ambiguity has been generated as a consequence of the associations that this concept maintained with other close notions[3] -like that of *feeling,* or *affection*-, as well as due to the ethical contexts in which the first discussions of its scope took place. In the Western World, such terminological confusion began with the Latin translations of the Greek philosophical works, particularly, with the Latin rendering of the term πάθη as it was employed by Aristotle, a confusion that started with Cicero and extended to Saint Agustin (*Civitas Dei*.IX.4), pervading later medieval philosophy. The movements of the soul (*animi motus*) had been called *passions*, but they also had other meanings like *perturbationes, affectiones, affectus,* whose connotations point towards a conceptual model of something invariant, a substance, and something foreign that changes or affects it[4]. However, such polysemy simply shows the general uncertainty which Antiquity had about the number, name and nature of all those mysterious and common experiences of the soul which sized it and dragged it into autonomous whirlpools of action, whether such transformations were thought to be originated by motu propio or by a foreign force to human substance.

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[3] I will use the term *notion* as a synonym for *concept*.

Ethico-philosophical discussions stand over more archaic mimetic frameworks -shamanic and oracular, where very active supernatural beings interfere in human actions-, something which made difficult a clear definition of natural scenarios. Think for a moment in the world of the Iliad. What is the relation of the heroes to their emotions? Where does Odysseus' cunning begins and Athena's whispers end? We read in the first Canto how Apollo's wrath by Agamemnon's offense to his priests jumps like a quick fire to Achilles, and Athena has to intervene to stop his sword and appease his rage so he does not kill the son of Atreus. The first discussions about emotions appear precisely in the sphere of the foggy relationship between humans and supernatural beings. In this context, emotions do not move beyond the notion of being terrible and irresistible affections that the human soul has to endure, a viewpoint maintained by both philosophy and tragedy in the Western World. Tragedy, as a ceremony of emotional education, conjures the vital liminality in order to transform it into the triumph of the organizer *sophrosyne*[5], a form of wisdom that agglutinates self-knowledge and the common state of mind, the prudence and temperance that maintains the group united in its most enduring vital project, achieving it through a ceremony of confrontation with *pathos*[6]. The restrain of the volatile nature of emotions is a common goal to all cultures, for without it the group cannot prosper. We read in the *Mahabharata* that *the man without anger surpasses the angry*[7], and we could say in general, that all politico-religious traditions have aimed at the guidance and taming of emotional experience through reinterpretation of its link to a supernatural world, which dictates its order of performance and proper enactment.

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[4] See Wolfson, Harry Austryn, *The Philosophy of Spinoza.* Vol. II. Harvard University Press. Cambridge (Mass.) and London. 1983. p.193-194.

[5] The main subject of philosophical discussion in Plato's *Charmides*.

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[6] It can be seen in the three main tragedians, to mention Sophocles will suffice (*Tragedies.* 2 Vol. Harvard Heinemann. Cambridge (Mass.) and London. 1981.) *Electra.* v.v.356 and s.q.; In Oedipus Tyrant the chorus is Apollonian when it says that Tiresias and Oedipus have allowed themselves to be carried away by wrath in the discussion, and precisely that is not what is needed in the circumstance they are in. (v.v.404-407). In *Antigone* the chorus affirms that the mind that is dominated by passion, especially during youth, is dangerous, and the words of the chorus with which this tragedy is concluded seem to be said directly from the mouth of Apollo: *Of happiness the chiefest part is a wise heart: And to defraud the gods in aught with peril's fraught. Swelling words of high-flown might mightily the gods do smite. Chastisement for errors past wisdom brings to age at last*. (*Antigone.* v.v.1348-1353) In *Philoctetes*, the chorus sings how unhappy are men who do not lead a moderate life. (*Philoctetes.* v.v.177-178.) In *Ajax,* despite the general Dionysian character of the chorus, they desire that prudence may assist Agamemnon and Teucer to be able to think sensibly in the midst of the dispute that they are maintaining. (*Ajax.*v.v.1264-1265.). An equivalent mood of *sophrosine* is found even in Aeschylus' tragedies (*Aeschylus Tragedies.* Harvard Heinemann. Cambridge (Mass.) and London. 1983.), see among other examples: *Prometheus.*v.v.1036-1039.; *Seven Against Thebes.*v.v.686-688; *Agamemnon.*v.v.40-263; *Choephoroi (Libation-Bearers)*.v.v.598-601.

[7] *Mahabhatata*. *The Book of Origins*. 7.d. *The Latter Days of Yayati*. Cit. Edition. p.197.

What is particularly uncomfortable both to philosophy and religion from the emotional world is the head-on collision that it has, in its most basic manifestations, with the ethical projects of a polis organized upon the principle of reason, where neither the passionate gods nor the brutalized humans have room anymore. In Plato's theories, emotions are rejected in the same manner as pleasure and pain are rejected: as the cause of woes and misfortunes which distance man from his immortal nature.[8] In Plato's case, it is the old Orphic doctrine of Soma-Sema at work, the set of beliefs that equates the human body with a tomb. As it is to be expected from this ontology, no analysis of emotions was performed from its grounds, for their doctrinal negative valuation removes any possible interest in them, with the exception of their mere political control. Although Plato had maintained that the *megista mathemata* of the philosopher[9] (the highest form of philosophical revelation) was similar to the initiation of the Mysteries -implying an equation *mathos-pathos*[10] that seems contradictory with his general ideas about emotions-, he refers by it to the equation of two divine forces in a mysteric liminal representation, apt for a non-human model of being which operates on an ideal level that is not met by human imperfection. *Mathos equals pathos*, the notion that knowledge is a movement of the soul, in the sense that it is moved by truth, does not mean that Plato is saying that our emotions are the clue to knowledge, but rather that knowledge is something exterior to human soul: truth is the divine passion which gives as a result knowledge. Both *mathos* and *pathos* are exomorphic representations in his system, solved endomorphically in political praxiological terms in the emotion of *sophrosyne*, as a (Pythagorean) human proportion, but most of all as an acceptance of the bounds and limits of human experience.

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[8] See Plato, *Timaeus*, especially 69a and s.q. Let us recall that in Plato's idealist philosophy, emotions, common to all humans (*Gorgias*. 481c), are responsible for binding the soul to the body (*Phaedo*. 83d), and are as irrational as the poetry that feeds them (*Republic*. 10.606) dangerously for the order of the Polis.

[9] *Republic*. 6503 e.4.

[10] See the study undertaken by Thomas Gould, *The Ancient Quarrel between Poetry and Philosophy*. Princeton University Press. Princeton. 1991.

One way or another social life is based upon emotional control, on the channeling of disruptive instincts towards a common project of order in accordance with some economic guidelines for survival. Moral law, inasmuch as it is the result of a successful tradition for restraining emotions –for it guaranteed the survival of the group-, is first thought as the way of things, as part of the cosmic order, and emotions are defined and understood in relation to it. The restrictions are hypostasized together with the chained emotions and the *Lebenswelt* in which the binding occurs, and cannot be thought separately, as an object within a system that could have its own epistemological content, may be even predicable at other cognitive scenarios. Thus, emotions can only be though within these restrictions as universal facts of the life of the group.

Emotions will have to wait until Aristotle for their first positive treatment, though always with the goal of developing a practice for political control. It will not be until the appearance of empirical psychology that their negative moral load will be discharged, as we can observe, for instance, in the qualification of the emotions as ailments of the soul made by a man of the Enlightenment such as Kant.[11] Aristotle understood that the control of passions gives the basis for civil virtues when they are guided by reason in order to encourage habits of excellence.[12] Such control is performed by the rational part of the soul over the irrational part, which by its nature obeys to reason[13]. The distinction between rational and irrational soul proves to be necessary in his system, not only to guarantee the independence of the concept of intelligence in relation to the one of character, but also to maintain coherence in the dynamics of his ethical doctrine. The postulation of a double nature of the soul in which the irrational part obeys reason is the basic moral axiom of Aristotelean ethics that will underlie all rational psychology. Such principle is not supported by experience, neither was ever the base of political praxis, but it gives for the first time a minimum autonomy for the understanding of emotions without a direct supernatural intervention.

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[11] Kant. *Anthropologie in pragmaticher Hinsicht.* Buch III. #72. Erich Koschny. Leipzig. 1880.

So, the starting point of his theory of emotions is movement, for the soul is that which primarily and pre-eminently originates movement[14], and is moved in return. Those forces acting upon the soul are called passions, or irrational soul movements, a concept in which Aristotle subsumes the experience of rage, fear, shame, sensual pleasure, and in general all that is followed by the pleasure or pain of the senses.[15] Therefore, we could say that passions are, under this point of view, causes which produce pleasure or pain in the irrational soul. They are forces of movement, for they change the human psyche from whatever state is experiencing into either the state of pleasure or pain, but they can only affect what is irrational. In the book *Categories,* the term *passion* is used as contrary to *action*, in an inconsistent manner to what we read in his books of ethics or in *De Anima,* where passions have a clear active component for they work as causes for pleasure and pain. Since the will is supposed to obey the intellect, passions cannot originate in a deliberate reasonable action. However, this distinction is never really clear in Aristotle's thought, for there are non-voluntary actions which are somehow affected by our doings and farings, as we read in relation to the concept of *tyche* (good fortune)[16], i.e. there is a class of actions, emotional and otherwise, which proceed by reason though they are not the result of our human will. *Tyche* and *automaton* (chance result) are incidental causes of the efficient order of nature, but they do not obey to deliberate action. While *automaton* is an accidental action which happened with no purpose, *tyche* is the collateral result of an action, an effect not aimed at but that is related to some purposeful action. It is easy to imagine emotional movements cause by *tyche*, in fact, emotions seem to be so related as to produce one another by *tyche*, as the cascade events of Greek tragedies and everyday life clearly shows. The question gets even more tangled if we consider, as Aristotle does, that the results of *automaton* and *tyche* actions are always such as could have been if purposefully aimed at by nature, and that there cannot be anything incidental if there was not prior to it *something primary for it to be incidental to*[17]. Such denial of chance and fortune at an ontological level, the idea that mind (*noein*) and nature (*fisis*) precede any casual action implies that the irrationality of emotions is incidental to a deeper sense of order, gives the grounds for the intervention of reason to correct the accidents and separation from the universal rationality, but blurs the causation of emotions under the physical scheme of movement, for emotions become irrational at the human level but part of a rational cosmic plan. Besides, passion is an action from the point of view of the person who behaves in accordance to it, and we can say that passions generate actions, but action could not be created out of non-action in Aristotle's system. If passion is to be understood in the twofold dimension of Aristotle's theory, as *passiones entis*, as something which incidentally happens to the subject (inasmuch as not necessarily aimed at by the subject), but also as a mover of the subject, something which alters his qualities, we need to explain how irrational causes can dominate a human being in a rational universe without its deliberate agency, and what is the purpose of such causation.

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[12] As it is sustained all along Chapter II of the *Eudemian Ethics.*

[13] Aristotle Ibid. 1220a 8-12.

[14] Aristotle. *De Anima*. Book 1. 403-404. An opinion which was shared also by Democritus, Leucipus, Anaxagoras, Heraclitus, Diogenes, Alcmeon and others.

[15] This is the list that he offers in the *Eudemian Ethics* (1220. b.11.), similar to the one offered in the *Nicomachean Ethics* (1105. b.19) where he names, anger, fear, trust, envy, joy, love, hate, longing, emulation and piety.

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[16] Aristotle. *Physics*. Book II. Chapter VI.

[17] Ibid. Translation of Wicksteed, P.H., and Cornford, Francis M. Harvard Heinemann Edition. Vol.IV. p.163.

Aristotle has to postulate two additional concepts, those of *faculty* and *habit*, in order to harmonize his emotional theory with his basic ontology. The first one is linked to the category of quality. A *faculty* or a *capacity* is a kind of quality of the soul in virtue of which humans who act by their passions are named according to them, whereas he defines *habit* as the causes through which these faculties become operational in the soul,[18] or, in other words, how passion becomes action. *Faculty* is, from this perspective, a capacity of the human soul to experience passions, although understood as a quality of the substance that is our soul, and passions are imposed to us through the repetition of habit, but in virtue of such quality. It is due to having the faculty of irascibility why I can be called irascible and act with anger, and I have anger because the habit of being angry, not tempered by reason, has strengthened that passion in me, until it has been transformed into action. However, emotions show another quality of our psyche besides its passive capacity to receive the movement of the passion, so we can say that emotions are also affective qualities which correspond to soul states (more or less permanent), and not just simply affections that happen by our faculty to experience something foreign to our personal psychological constitution, as Aristotle observes in emotional hereditary predispositions to certain passions.[19]

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[18] *Eudemian Ethics.* 1220. B. 11. See the discussion about the qualities in *Categories.* 8.b.25.

The model is faced with the difficulties of harmonizing the physical system, governed by causation and movement, with the inner workings of will and culture, and all this without the aid of a minimal physiological theory to bridge the gap between those two spheres. To ascribe both reason and irrational causation in relation to emotions, the postulation of a faculty to receive emotions and the existence of prenatal affective qualities in the soul creates a cosmological tension between reason and irrationality in the human psyche difficult to solve on Aristotle’s grounds. What is the purpose of emotions in a rational universe? The answer is never clear, and it could not ever be one on mere rational grounds unless we turn to a final ethical explanation of the universe in which the control of emotions obeys a rather inconsistent macro-plan for the transformation and control of an evil nature (as medieval philosophers will do), something which was not exactly in Aristotle’s mind. The concept of habit is the tool to amend both the casual and the irrational emotional drives, though it does not solve the teleological problem of emotions.

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[19] *Categories*. 8.b.33.

In Aristotelian terms, passions are predispositions of the irrational soul, but also affective qualities of the irrational human psyche. It is never clear whether as predispositions all humans have the capacity for all emotions but only enact some of them, or whether we enact only those emotions which in our irrational soul are imprinted from birth giving a particular configuration to our psyche. In both cases, they are made effective through habit, which can be guided by means of rational education. The frequency of habit will directly affect its condition of rationality, for both the excess and the lack of the conscious action, which arises out of will, violates the middle term which to Aristotle is the mark of any healthy physiological action.[20] Emotions, insofar as they are involuntary, are not reproachable when they are bad, neither praiseworthy when they are good, but rather they are a kind of raw material with which reason works to reach excellence (*arete*) in life. The doctrine of the middle term is made evident in the *frequential quantitative* classification he undertakes of fourteen passions within an imaginary emotional continuum in whose extremes are found vices that are equidistant from a middle term (mean) in which passion manifests itself as excellence.[21] Thus, for instance, there is a quality that when excessively repeated we call *recklessness*, and when its use is deficient, *cowardice*, whereas when it occurs in its right measure, we speak about courage. On the other hand, in the Aristotelian list there are passions that do not even have a name, like the emotion of envy by deficiency, or by its right measure, to which he calls *righteous indignation*, being indignation an emotion that would seem to be closer to anger. Moreover, the fact that not having envy or not feeling anger may be considered as positive emotions for a smoother development of the group, it would question per se the Aristotelian theoretical model which advocates a faculty over which the habit operates, for if an emotion expresses either a faculty or capacity of the soul or one of its affective qualities, the absence of any of these expresses at least the deficiency of such affective quality (for the capacity might still be there, though no active), therefore we would have a positive quality of the soul whose nature is not being an affective quality, which does not make any sense.

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[20] *De Anima*. 424 a.1.

[21] The table is in the *Eudemian Ethics.* 1221. a.1.

The problem we encounter in relation to the concept of habit as the rational tool to control emotions is derived from the imposition of a model analogous to the one that operates in the syllogistic theory, governed by the notion of the *middle term*. The middle term of emotion, where ethical excellence is to be found, is not postulated as an inductive generalization from the physiological observations of the *Lebenswelt*, but geometrically, just like the middle term of the syllogistic deduction is postulated: as something outside both extremes which relates them and makes them intelligible through the relation.[22] Even though Aristotle understood that the precision of reasoning is proportional to the subject matter being reasoned about,[23] that logic and politics, for example, cannot proceed with the same expectations of rigor, when dealing with emotions he has to maintain the basic principles of his thought, concerning the rational unity of the world. Thus, since action and passion are movements, and all movement is continuous, it is possible to divide passions according to their frequency into excessive, deficient and balanced human habits, and this middle and balanced term -insofar as upper limit for deficiency and lower limit for excess- is desirable for the particular physiological constitution of the human being, not so much on empirical grounds (as it would seem by Aristotle's inclination towards natural sciences) as on the transcendental order of logic. The failure of Aristotle in giving a psychological explanation of emotions consistent with his ontology did not hamper its ethical success, for the proposed orientation of actions based on goals is perfectly compatible with syllogistic reasoning, and with the theoretical schemata of the final cause. The fact that emotions were poorly understood through the concept of passion did not rest a bit of strength to his ethics. Their nature was of secondary importance in relation to their political and juridical control, for it was clear that their sphere of action was the polis, the relation between the members of the community. For a philosophical organization of the group, i.e. according to principles of a rational universal law, it was necessary that all emotional actions could be mediated by reason with the creation of proper habits, binding through the rational will all the citizens to the law, citizens which could be made accountable for their actions as a consequence of their ethical education, which tames appetites and desires conducting them by thought and not by mindless choice or mere desire.

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[22] See *Prior Analytics*. 26. b. 34.

[23] Affirmation that he curiously expresses in the *Nicomachean Ethics*. 1094b- 13-s.q.

With the triumph of Christianity, the rational undertakings to understand the nature of emotions suffered a serious drawback. The principle of a universal law was still at work in the social Weltanschauung of the Western and Eastern Roman empires, though it receded from the achievements of its logico-philosophical epistemology to a mixed onto-epistemology with more archaic forms of rationality of universal law linked to the will and ethical plan of a supernatural being. For most Christian theologians, emotions express virtue and sin on a cosmic scale. As Aquinas puts it, the passions of the soul were part of the sensory appetite, whose object was thought to be good and evil[24] they are not anymore a question of proportion and measure but qualitative forces whose value is metaphysical and show the dynamics of the soteriological plan. Such plan does not follow a strictly rational purpose, in fact, the universe is a mysterium tremendum and the feeble human reason could not and should not attempt to scrutinize the will of the divine, manifest to men only through the revelation jealously ministered by a priestly caste. The ideal of sancta simplicitas, defended by Clemens of Alexandria and many others, took the place of sophrosyne. Instead of prudence and temperance directed by the ideal of self-knowledge and self-reliance of the Greek philosophers, simplicity of mind, negation of the senses and fear of knowing (original sin) rules the life of the earthly community, becoming human emotional life a mere fighting ground for an inconsistent salvation dynamics whose driving force is sin. Origenes and later Evagrius Ponticus (the artifex of the Seven Deadly Sins mythology, together with Pope Gregorius I) defended the notion of apatheia, the renouncing of all emotions and their deliberate repression, an ascetic ideal –common to many religious ways- where reasoning was substituted by prayer, word by silence, arete by weeping and sophrosyne by an apology of stupidity. Emotions stand at the center of the communal life but as exomorphic representations of the soteriological drama, closely associated to the created substance of the human soul, though such relation remained a mystery. In this sense, their workings did not change much in relation to the religious management of emotions that we find in the mysteries and the tragedies of Aesquilus and specially Sophocles, though pity, as a collective tool-ideal for social order, has received a trans-mundane turn and the control of emotions opens up to a new dimension of ghostly paranoia heavenly sanctioned by a strict and angry supernatural being.

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[24] Thomas Aquinas. *Summa Theologica*, Question 95. Article 2.

Even those theologians who were not openly against philosophy, like Gregory of Nisa, Nemesius of Emesis, Aquinas and others, never treated emotions as forces outside the soteriological drama. In most cases, their expositions are epigones to Aristotle's system, whose dialectic of movement in relation to the soul satisfied the metaphysical speculations about the grounds of the human city (Earthly Jerusalem). Passions, i.e. those emotions which are not qualified as virtues, are considered the very action of the passive power[25]. Such nonsense has to be understood in the frame of the cosmic drama, with all the manichean connotations which underlie medieval Christian doctrine: passions are the forces of Evil, the work of the Enemy, the disruptor of God's order. In the distinction between a passive and an active dimension of emotions we can hear Aristotelian resonances of rational and irrational desire, of intellectual pleasure as opposed to that of the senses.[26]

An idealized state of original innocence and perfection, pretty much imagined as an emotionless state, conditioned severely any attempt to give a consistent account of human emotions. Even Aquinas' system, probably the most carefully elaborated of all, never quite solved the contradictions in relation to emotions. For instance, the recognition of some form of passion in God and the angels -specially anger against evil, something which the bad tempered God of the Old Testament so frequently displays-, would imply that there is some form of anger not born from concupiscence, but from the will of

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[25] Aquinas. Ibid. Question 79. Art.4. Objection 5.

[26] Like we read in *On the Soul.* 432 b. 1-6. And in the *Nicomachean Ethics.* 1175 a. 26-28.

God (for God has not sensual attachments). However, how could the will of God be moved by passions, which are the very action of the passive power? The only way out is to declare that when repelling evil, the irascible power of the soul is a virtue, but not in any other case[27], something which darkens more the blurred concept of emotion.

The cosmic drama developed by Christian myth through the centuries, synchretizing mythologems from several Middle East traditions, was a dead end for the understanding of emotions, either in the rational way of Ancient philosophy or in any empirical scientific manner, for it had an onto-epistemology which was adversarial both to reason and to experience. This was not unique to Christianity, but common to all major State Universal religions of the past (and the present), who's mythological remnants of King-God could not conceive the universal law as independent of the will of the Godhead[28]. In Aristotle's system, the movements of the soul were never overwhelmed by a transcendental dimension though they were conditioned by his system of physics centered on the concept of movement (and the Unmoving Mover). For Christians (and equivalent myths of State Universal religions), the soul is never an object for study. Its nature is irrelevant outside the politico-religious drama of the chosen community in which objects and relations have a definite unchangeable and real constitution given by the Law, an universal scripture which contains anything and everything that has interest for mankind. Emotions are just the way things are, like in more archaic forms of myth, but within that kind of narrative they can never obtain a natural dimension and be studied in natural terms, for nature is not central to the creation plan, but subsidiary. That was not the case in Aristotle's system which included natural observations of phenomena that would have to be explainable within the rational frame and never contradicting it. Thus, we find observations and reflections on the soul in his books on nature[29], an orientation that in the Middle Ages we will only find outside the Christian tradition. Avicenna went even further than Aristotle, noticing how closely related are emotions to physiological states[30]. Anger, fear and similar emotions arise from the senses[31] and not from other supernatural faculties, which, though at work in ordinary experience, are modulators of the natural mechanisms but neither the unique or the first cause of the emotional action. Such independence of the physis in relation to other cosmic moral plans is undoubtedly Aristotelian, but has an added content which prefigures emotional theories of the Enlightenment, linking emotions to the language of animals: for animals can express their emotions to one another, a lamb can perceive the emotional intention of the wolf through a power which is not reason, and feel fear instinctively, so emotions can be though as some sort of apprehensive faculty which executes a judgment[32], i.e. some sort of intelligence.

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[27] That is Aquinas view. Summa Theologioca. Quest. 82. Art. 5

[28] See Part III of Mythopoetics in relation to King-God mythical planes.

An open critique to the treatment of emotions on transcendental grounds was clearly stated by Baruch Spinoza, who laments that man is conceived in those systems as a kingdom within a kingdom under the belief that man disturbs nature rather than follows its principles[33]. Spinoza noticed that no one had defined the nature and strength of emotions (affectus) as a consequence of considering them repugnant to reason, or trivial and frivolous matters, but since nothing in nature is a flaw[34], emotions can only prove, once properly understood, nature's efficacy. His doctrine has to be understood in the milieu of the philosophical discussion against Descartes' dualism of body and soul. Whereas for the Spinoza emotions are affections of the body that are accompanied by confuse ideas, in which the soul affirms a quantitative change in its vital impulse,[35] to Descartes emotions are passions caused by the body, which maintains a relation with the soul through the animal spirits found in the pineal gland.[36] Such Cartesian reference to biology should not mislead us with respect to the method used by these theories. This latest gland, from whose physiological functioning the 17th Century scarcely new anything beyond what is implied by its anatomical location in the brain, was a mere theoretical postulate based on the most blatantly fantastical empiricism, and that served to poorly mediate the worlds of nature and the spirit, pretending to dispel the inconsistencies derived from the narrative of a radical separation between body and soul. The way in which the images are formed in the gland, which supposedly has to mediate between the world of the senses and that of the soul, is never explained -as it could not be any other way-, hence reproducing the classical problem of idealism when trying to explain the mechanisms of interaction of the immaterial with the material. Spinoza disposes of the gland by postulating a no less fantastic isomorphism between the soul and the body, although more consistent with the postulates of the rational method: the concatenation and order of thoughts and ideas about things in the soul, is isomorphic with the affections and images of things in the body.[37] For both thinkers, emotions involve a double phenomenon, of nature and soul, although Descartes tries to adjust his concept to a Christian theology in which passion can be controlled by means of *ratio et auctoritas,*[38]for he naively thought that mind has absolute power over its actions, whereas in Spinoza there is a naturalist rationalism in which emotion and reason are linked like two concurrent forces of nature.

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[29] See *History of Animals*. Book VIII

[30] Fear and anger to changes in breathing, for instance. Avicenna, *The Canon of Medicine*. No. 161. Trans. Oskar Cameron Gruner. AMS Press Inc. New York. 1973. p.p.118.

[31] Avicenna. Ibid. No. 167. P.121.

[32] Ibid.No.180. p. 137.

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[33] See Spinoza. *Ethics*. Part III.

[34] Nihil in natura fit, quod ipsius vitio possit tribui. Spinoza, *Ethics.* Trans. R.H.M. Elwes. Dover Publications. New York. 1951.

[35] See Spinoza, *Ethics.* Part IV. Especially. #XI and XII.

[36] Cf. René Descartes. *Les Passions de l'Ame.* I.Art. 31-35. (1649). Philosophie. 2010. P.37.Web.

To Spinoza, emotions condition the soul to think in a determinate manner, to think one thing and not another, which is equivalent to postulate that the body conditions the soul, but only insofar as the latter has confuse ideas. Such conditioning is nor permanent and the confusion disappears as soon as the isomorphic mental image of the passion is substituted by a clearer one through the mere rational exercise of the soul in which stronger ideas are proposed. Spinoza defines emotion as the modifications of the body by which its active power is increased or decreased, made splendid or constrained, and also the ideas of those alterations.[39] When we are the adequate cause of such modifications, Spinoza calls the emotion an activity, if not, he calls passion to the alteration. The notions of *causa adequata* and *causa inadequata* or *partialis,* was developed by Scotus Eriugena.[40] Whilst by *causa adequata* it is understood a causal connection in which the effect is clearly and differently perceived by means of the cause, the *inadequata* does not allow such a perception, a highly useful notion to logically and epistemologically justify the human inability to determine clearly any empirical connection derived from a passive alteration, and therefore the inability to form distinct representations out the mere experience of life. Since a fair number of our experiences could be said to be determined and produced beyond our will, we can expect mainly a confuse mind populated by inadequate causes. This implies that our ignorance is deeply grounded in our intellect and that the *true* and adequate mode of things is only partially within our grasp. Furthermore, Spinoza considers that the mind insofar as it has adequate ideas and also insofar as it has confused ones, persists in its being for an indefinite period[41], i.e. there is a principle of inertia at work in the human mind which operates upon both modes of emotions, as activities and as passions. In fact, confuse ideas do not disappear simply by knowing that we have them, for the power of man is limited compared to that of nature, understood as Deus sive Natura (DN), and only a stronger passion can substitute a weaker one.[42]

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[37] See Proposition 1. Part V. *Ethics.*

[38] To Descartes, as Spinoza tells us when criticizing the theory of the pineal gland, no soul is so weak that it could not acquire, if well guided (by the *ratio et auctoritas* of the Catholic Church), an absolute power over its passions. This is the Stoic theory, but also the one adopted by the Roman Church, by which the punishment to the sinners is justified. See Spinoza. Preface to part V. *Ethics.*

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[39] Per *Affectum* intelligo Corporis affectiones, quibus ipsius Corporis agendi potentia augetur, vel minuitur, juvatur, vel coercetur, & simul harum affectionum ideas. *Ethics*. Part III. Def. III.

[40] Cf. Wolfson. *The Philosophy of Spinoza.* Ed. Cit. p. 188.

[41] Ethics. Part III. Prop.IX.

Spinoza's major contribution to the study of emotions is the explicit epistemological dimension which he gives them. Since a man can only know himself through the modifications of his body, an epistemological principle which applies also to nature, and since those alterations are either the outcome of activities or passions, emotions are not only the conditions of possibility for our self-knowledge, but they are also its content. To know ourselves is to observe our emotional dispositions and their vicissitudes. Such emotions are either activities or passions. When the observation is of our activities, we feel pleasure, but when we observe our passions, we feel pain; for pleasure is a transition from a less perfection to a greater one, and pain is the opposite transition. The mere fact of observing our activities produces pleasure, for such observation implies an increased rational stand in relation to the already adequate cause which connects activities, and therefore, the transition of our intellectual experience to a greater perfection. But such is not the case when we observe a passion. For Spinoza, the order and connection of ideas is the order and connection of things, and vice versa, i.e. ideas are isomorphic to things and body alterations[43]. Contrary actions cannot coexist in the same object for long and they change until they are not contrary anymore. Likewise, contrary ideas cannot coexist in the mind at the same time for long, so when we observe a passion which perseveres in us while we observe it, we can only be doing it from the perspective of a confused mind (partial or inadequate cause), the one producing our idea of such passion; for if it was considered from the vantage point of a clear idea (adequate cause) the passion would disappear.

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[42] Cf. Spinoza. *Ethics.* Part IV. Propositions I-VII.

Thus, we could say that a clear mind transforms passions in activities, a conclusion unthinkable from the Christian (and Universal Religions) point of view, and also alien to the Aristotelian system. Aristotle would probably agree with Spinoza's isomorphism, for he thought that actual knowledge is identical with its object[44], and would appreciate the solution that Spinoza found for the aporiae of the double nature (active/passive) of the emotions via the concept of adequate cause, but he would probably would disagree in relation to the independence that emotions show in respect to the will, or with the strong epistemological role that emotions play in the Spinozist cosmos.

Spinoza's system tries to unify the natural and the moral worlds by making reason an instrument of nature, though not the unique force of order: it is a necessary tool but not sufficient to understand man and DN. In fact, he does not even regard man as a being whose specific determination is reason, but instead, he considers that human essence is formed by certain modifications of the divine attributes, specifically, from a part of the understanding of DN and of his extension.[45] For Spinoza, substance does not constitute the actual being of man, for the being of substance implies necessary existence, while man's being does not. Since human essence is just a mode of substance, a set of particular modifications or alterations of substance, our reason could hardly aspire for necessary connections in its workings. Reason could not be the dominant attribute of DN for reason implies purpose and necessity, measure and limits, and for Spinoza DN has neither purpose nor beginning or end,. Therefore, there is a contradiction between the workings of our human reason and the divine one, and this would imply a double principle of action in the universe, something that would be contradictory with the theorems in which it is shown that DN is the sole and immanent cause of the universe which acts in virtue of its own laws.[46] Besides, not even divine reason could be the defining attribute of DN, for DN has infinite attributes and each one of them must be conceived through itself, so it would be contradictory with such constitution the existence of a dominant one.

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[43] See Part V. Axiom I. and Prop. I-III for the following.
[44] De Anima III.7.

Reason is capable of producing activities or positive affections, it can propose models of clear thought, models which can be more perfect according to the perfection of the thought, something which depends on the perspective taken:

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[45] Ibid. Part II. Propositions X-XIV.

[46] As it is stipulated in the theorems of the first part of the *Ethics*. Particularly contradictory with propositions XVII and XVIII.

the perspective of existence or that of the essence, of the finite or that of the infinitude and eternity of DN. Our ailment occurs because of the inability to think clearly the origin and motive of passions, to understand their place, and therefore, ours, in the natural schema of things. Happiness can only be produced from the thought that is based on the divine perspective, what Spinoza calls *the third kind of knowledge*, which is equivalent to the intellectual love towards DN from which happiness is derived, not as a reward for virtue, but as virtue itself.[47] The third genre of knowledge[48] is the one in which we proceed from the adequate idea of the formal essence of certain attributes of God to an adequate knowledge of the essence of things, a type of mystical intuitive knowledge in which the attribute of extension (corporality) is clearly understood, and the confusing passionate ideas in the human soul are no longer produced, which had been originated by a mere knowledge from the senses, from experience, or from inferences. To Spinoza, knowledge by inference (of the second kind), although true, take us only from one efficient cause to another, and even though ultimately such causal sequence refers to the first cause, it involves an infinite series, something which would impede to our limited mind any form of perfect knowledge by proceeding in this manner. For this reason, the third kind of knowledge must be sustained on some kind of formal causality through which we could think the formal essence of the attributes, and from there -in a kind of cosmic-formula syllogism-, attain the substance.[49]

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[47] See propositions XLII and XXXVI of part four.

[48] The first kind of knowledge is the one given by the senses and experiences, whether vague or not. It is a false knowledge. The second kind of knowledge is not confined to the experience of things, but it is founded on reason. It concerns a deductive knowledge of two types: one that proceeds up to the cause from the effect, and the other, from a universal that is accompanied by a property, that is, we deduce the conclusion of a syllogism. See part II of the *Ethics*, and the treatment of this subject by Wolfston in *The Philosophy of Spinoza*. Vol. II Chapter XVI.

As we can observe by exposing the general lines of the Spinozist system in relation to emotions, though these are tools for self-knowledge inasmuch as they are alterations which offer data to our minds about the universe and its constitution, they are still absorbed in transcendental ontology, and minimized by epistemology in their practical human function as cognitive errors. Spinoza's immanence is rather relative, for his pantheism, like any other pantheism, related to the myths of Purusha or the Adam Cadmon, assumes the transcendentality of a being which is absolutely infinite. In fact, Spinoza's pantheism has lost the immanent traits of the anima mundi myths in which nature is a direct and intimate experience of the divine in every one of its objects.

Seventeenth Century European rational psychology employed observational data in relation to emotions as a mere justification for its metaphysical theories. Physiological knowledge was scarce and fragmentary, and the weight of religious and social censorship was widely suffered by any philosopher trying to unveil the workings of the human mind. Both Descartes and Spinoza noticed, following Aristotle, that emotions also occur in animals, but such observation follows the only purpose of marking the difference between human and animals, not of declaring their continuity. In the case of Descartes, the emotions observed in animals -which he considers more violent than those of human beings- are used in an argumentation to negate their ability for thought, widening even more the traditional gap between the spheres of irrationality and reason. According to Descartes, even though emotion in humans is associated with thought, we could not infer from it the same for animals. Animal are emotional but not thinking creatures, for if they were, they would have already expressed their thoughts to us like they have done with their emotions.[50] Descartes is willing to admit that emotions in animals have a physiological origin, and that they are derived from the disposition of their organs, but such derivation is different in humans, for it is accompanied by thought, while animals are mere automata.[51] It is interesting to notice that a discussion on animal automatism which contrasts the machine-like nature of emotions with the supposedly non mechanical nature of our reasoning contradicts the frame of the science of logic with which Descartes was well accustomed. In the *Discourse*[52], he mentioned that logic is of avail in the communication of what we already know but not in the investigation of the unknown, i.e. as a mere tool for rearranging knowledge which assists the process of proof, a notion which implies a mechanical dimension for the reasoning mind. The fact that thinking is also a mechanic action was extensively thought during the XVII Century. For Leibniz, reasoning could be reduced to the mechanical operation of going through a list, an idea which he developed from the works of Raymond Llul and Thomas Hobbes.[53] So why is Descartes ignoring on purpose the mechanical nature of logical thought? More than *ignoring* we should probably say that he simply does not consider logical thought to be the core of reason. For Descartes, thinking is a four dimensional activity, it is the result of the work of the intellect, the imagination, the senses and the will. These four actions can have as origin either the soul or the body, when they are soul actions they are called *volontés*[54], and they are called *passions* when the cause in the body. Aquina's philosophy underlies the division, and although Descartes never works his discourse explicitly in terms of the soteriological Christian drama, but his total submission to the authority of Rome conditions his psychological system, which rejects axiomatically any possibility of mechanic workings for the soul. As a matter of fact, the mechanical nature of the soul would destroy the salvation schema based on punishments and rewards. In order to preserve the Weltanschauung, he has to declare the absolute control of the will upon the passions[55], and by doing so, he reduces the study of emotions to their relation to such control. As he will express it: the function of passions is merely the fortification and conservation of good thoughts in the human soul[56], i.e. they are part of the Christian ethical drama.

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[49] Medieval philosophy, following Aristotle's theory of the four causes, had questioned which one of them was God. By theologically starting from the immateriality of God, it could not be the material cause, therefore the other three were granted. The theory was gathered by Maimonides, and from him by Spinoza. See Wolfson, *The Philosophy of Spinoza.* Ed. Cit. Vol. I. p. 302.

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[50] Cf. René Descartes. *From a Letter to the Marquess of Newcastle.* 23 November 1646. In Rosenthal, David M. Editor. *The Nature of Mind.* Oxford University Press 1991. p. 35-36.

[51] Cf. Descartes, *From Letter to More.* 5 February 1649. Ibid. p. 37. A thought which is also expresed in *Le Discours de la Methode*. Ian Maire. Leyde 1637. p. 55-56. La Gaya Scienza June 2012. Web.

[52] Part. II.

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[53] R. LLul, *Ars Magna*; T. Hobbes *Computatio sive Logica* (In *De Corpore*). See on this W.Kneale and M. Kneale. *The Development of Logic. The Interests of Leibniz*. P.325.

[54] Descartes. *Les Passions de l'Ame.* Art. 17 and 18. Ed. Henry Le Gras. Paris. 1649. Philosophie. 2010.Web.

[55] Ibid. Art. 50. Something criticized by Spinoza in Ethics. Part V.

For Spinoza, the specific difference between animals and humans in relation to emotions could not be given by thought, but by the difference in essences of one and the other, which implies distinctive abilities of ideation, more or less perfect.[57] He noticed the continuity but establishes an essential gap: we share, for instance, the procreation desires with the bee or the horse, but for the animals in one case is an insect desire, and in the other, an equine desire, while for us is a human desire. However, there is a major gap between our essence and those of animals: human emotions are accompanied by rational processes, whilst those of animals are not, for these do not possess the second kind of knowledge, and their confuse ideation occurs only in relation to experience. In fact, even among humans emotions are experienced differently, according to the use that is made of the second kind of knowledge, so a drunkard and a philosopher do not experience joy in the same way, though they both share the human essence, which qualifies the experience as of a same species and unique in relation to animals.

Curiously enough, the theses of Modern Rationalism come short in relation to the Aristotelian ones in what pertains to the emotional continuity among living beings. To Aristotle, the emotional difference between some animals and humans is only quantitative and not essential; in fact, he considered that humans and animals have some psychological qualities that are identical, whereas others are only akin, and a third group of them maintain a relation of analogy.[58] It is remarkable how Aristotle established a full continuity of life from the inanimate to the animate, by simple though clear minded observations. Moreover, Aristotle understands that there is continuity also between the emotional desire, that we share with animals, and the intellective activity, and that the actualization of a desire, like the one that can be present in an animal is, in fact, a substitute for thought.[59] Aristotle did not find himself constrained by the theological myths which make the human a being essentially different from animals, so he could start out from his observations without the need for making them to conform to the narrative of a sacred book that separated ab initio humans from the rest of nature.

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[56] *Or, il est aisé à connaître, de ce qui a été dit ci-dessus, que l'utilité de toutes les passions ne consiste qu'en ce qu'elles fortifient et font durer en l'âme des pensées, les-quelles il est bon qu'elle conserve, et qui pourraient faci-lement, sans cela, en être effacées.* Les Passions de l'Ame. Art.74.

[57] Cf. Spinoza. *Ethics.* Part III. Scholium to Proposition LVII.

Following the Aristotelian tradition, both Spinoza and Descartes made lists of emotions, actually, very similar to those of the ethic writers of the epoch. Spinoza simplified Descartes's list of six basic or primitive passions, admiration, love, hate, desire, joy and sadness,[60] reducing them to three: desire, pleasure and pain, but deriving from them forty eight passive emotions.[61] These lists, derived as much from the psychological observation of morals as from the Aristotelian tradition, are at best rude tentatives for reducing the vast realm of *affectiones* to an intellectual schema which conveniently considers and manages a small set of emotional principles whereby to deduce all emotions. For instance, the distinction between *appetite, will, desire* and *impulse*, though concepts that might be subject to all sorts of metaphysical subtleties, is a mere terminological matter. In fact, Spinoza’s list of emotions is relativized from the moment that he recognizes that emotions are innumerable in their composition, for there are so many classes of joy, sadness, love, hate, etc., as there are objects that affect us.[62] The diverse lists elaborated by ethic writers functioned more like exemplifications of the theoretical system in which they were inscribed than as precise descriptions of emotion, or of the group of emotions that were associated under the same concept. Little more could be expected from these classifications, which simply enclosed the emotional domain around the parameters of desire, pleasure and pain, as Aristotle had already done, confirming, by means of the almost bi-millenary repetition of the same emotions, that these were the ones –or some of their variants-, and not others, thus having their categorization and order a practical social interest, as a metaphysically grounded political guide for citizens behavior. However, a major problem in all these systems which included as basic active emotions pleasure and pain was the inconsistency of considering pain as an active drive in the cosmic drama without falling into Manichean metaphysics. If we do not intend to postulate a perverse and contradictory cosmos, in which reason and virtue share the same attributes of irrationality, pain must be excluded from the active engine, although it can proposed as a secondary product of partial scenarios of action, of actions that correspond solely to the perspective of finitude and ignorance. For although none of this philosophers confused pleasure with what is morally good, none of them either considered that pain could be an active driving force on a human or on cosmological scale. The happy man, as someone that fares well and lives well[63] might be accompanied or not by pleasure, but he certainly cannot not be determined in his actions by mere pain. Once again, it was precisely Aristotle who better understood that there were contradictions in considering pleasure and pain as emotions, though they were drives for emotional action and at the same time the result which followed emotions[64]

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[58] Cf. Aristotle. *History of Animals.* Book VIII. 588b 1-3. The emotional and intellective capabilities of animals have been observed by all primitive cultures, who even considered them gods, even though, reflections more interesting and founded in experience only occur from Aristotle onward. The tradition that will arrive to Darwin covers, amongst others, the reflections of Michel de Montaigne (*Apology for Raymond Sebond*. *The Complete Essays.* Stanford University Press. Stanford, CA. 1992.)

[59] See Aristotle, *Movement of Animals.* 701 a.31.

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[60] Descartes. *Les passions de L’Ame*. Art. 69.

[61] To Spinoza, the first active ones are *desire* and *pleasure*, for he considers that *pain* is always an active emotion. See the end of Part III of the *Ethics.*

[62] Cf. *Ethics*. Part III. Proposition LVI.

As we have seen, the conceptual mainframe of philosophical modernity in relation to emotions is still Aristotelian, although incorporating part of Medieval metaphysical discussions concerning the difference between ontology and psychology, between essence and existence, a Platonized Aristotelianism that inevitably relegates emotions to the field of the latter, existence, where it is found the contingent, the transitory, the confused idea, the error, something very different to the proposals that we read in Aristotle about the emotional dimension of cognition.[65] To this we have to add the theoretical climate propitiated by the incipient science of mechanics, which makes emotion to be -as a property of matter (an idea which had a general consensus) - utterly reducible to automatisms, or to the notion of *causa inadequata*. However, it is precisely the idea of emotion as automatic movement of the body in relation to outside stimuli what will hinder further developments of the important notion of continuity of human-animal emotional realms. Such continuity will not be completely acknowledged in the modern world until the enlightened theses of La Mettrie,[66] who covered the essentialist gap by declaring them both automatic, mere machine-like physiological functioning of animals and humans. Like Aristotle, La Mettrie considered nature a continuum of life, from the plant to the human, with rather arbitrary lines between the conceptual realms established by natural philosophy[67]. For La Mettrie, man’s physiology works like a device, and its main leverage is in the brain. He declares useless for philosophy the

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[63] Aristotle *Nichomachean Ethics*. 8. 1098b. 20.

[64] Aristotle. *Eudemian Ethics*. 2. 1220b. 13-14.

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[65] In the *Eudemian Ethics,* knowledge is part of the table of emotions. 1221 a.1.

[66] Julien Offray de La Mettrie. *L’Homme Machine.* F. Henry. Paris. 1865. p. 128.). The machine quality in relation to the movement of animals was already highlighted by Aristotle in *Movement of Animals.* 701 b.2.

[67] Ibid. p.151.

Leibnizian, Cartesian or Malebranchian thesis in relation to the human soul, for they postulate entities and substances with such certainty that it would seem that those philosophers had seen them and counted their numbers[68]. La Mettrie calls for comparative anatomy and medicine in order to solve the disputes about the nature of emotions in human and animal. Man is a machine, though composed in such a manner that it is impossible to form a clear idea of its constitution without careful physiological investigations. A believer in a universal natural law, his Epicurean epistemology drove him to the observation of the inheritance of emotions, and the independence that they show in relation to the will. Why the simple idea of a beautiful woman causes all kinds of movements and particular desires in men?[69] asked himself La Mettrie. And he answered that in all those movements we cannot look for mere moral answers but the machine workings of our bodies in which the will plays but little part. The virtues of the soul cannot go further than the strength allowances of the body, in fact, as La Mettrie noticed, desires change with age and with fever[70], so the metaphysical treatment of emotions are but vain constructions, empty theories.

A very similar materialist stand is found in D'Holbach theses on emotions (he calls them passions). In a world fully interconnected by causes and effects, in which nothing operates independently, it would be foolish to ascribe independence to the will in relation to emotions (passions). Nature marks to man the line to follow, it gives him the reason for his being this and nor that, his particular emotional configuration and the means to accomplish the ends of his intellectual and emotional endeavors[71]. It is interesting the connection that D'Holbach establishes between emotions and survival[72], an idea which will only be fully developed later within the frame of evolutionism. Passions are movements of attraction and repulsion which drive men towards objects and actions or away from them, and the different names that they receive are related to the different objects that excite them. His interest in emotions is part of his program for the development of a political science based on natural science and, accordingly, he considers that politics should be the art for the regulation of human passions through habit and education, leading them to the best social interest[73]. The ruling force here is an exomorphic reason allied with prudence[74] in which the language of nature is formulated, a language spoken by man. Such Aristotelian-Epicurean program, aimed to political action, pretty much like Aristotle's, was restricted in its formulation by the *a la contra* character of its atheist contents, particularly by the need to prove that atheism was compatible with the morals inherited by his society. However, it is interesting to observe that he did not realize the link between those Christian morals he was attacking and their basic grounding in survival functions, despite the more or less hallucinated contents of their myths, a twist that will have to wait for Nietzsche's exam of Western Culture. Emotions are still a datum of nature, a final representation of an exomorphic mechanical world.

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[68] "comme s'ils les avaient vues et bien comptées". *L'Homme Machine*. Op.Cit. p.22.
[69] Ibid. p.121.
[70] *Les goûts changent avec l'âge et la fièvre*. Ibid. p.27.

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[71] Paul Henri Thiry, baron d'Holbach. *Système de la nature ou des lois du monde physique & du monde moral*. 1770. Edition Web. http://classiques.uqac.ca/ p.p.59-60.

[72] Ibid. p. 113.

[73] Ibid.p.108.

[74] Ibid. p.p.89,146.

It is interesting to observe that he advent of empiricist psychology did not change much the general frame for emotions, as one would might expect. Locke is the first Modern philosopher who formulates an epistemological theory that separates psychology from theology by means of the refutation of the psychological innatism of moral ideas[75], a thesis which justified the Christian postulates about the empirical relevance of transcendental ethics, the intervention of the Christian god in the world, and the idea of *free will* in relation to sin and guilt. For Locke, there are not *koinai ennoiai* (common concepts[76]) imprinted in our minds at birth, whether speculative or practical. Koinai ennoiai is how Euclid called five propositions of his *Elements* which were included after his famous five axioms (aitemata), five statements which formulate some sort of basic intuitions of identity, quantity and space[77]. This is not directly the context for Locke's discussion, who answers Descartes ontological thesis of certain ideas in human mind that could not have had their origin in experience but in divine creation, though it is indirectly related –adding the general Aristotelian discussion- to how is it possible the knowledge of the world by the human mind. Aristotle had called *common sensibles* to the primary qualities of objects, and he included amongst them: movement, rest, number, figure and magnitude,[78] considering that there was an isomorphic link between these qualities and the mind that perceived them based in the continuity of thinking with the objects of thought. He noticed that there is not a special sense required for the perception of common sensibles,[79] and that somehow they make possible sense perception, while there are also other qualities in the perception of objects which are related to a particular sense, like color to sight, or sweet to the taste. It is through these general conditions of perception that our intuition occurs. For Locke, the connection mind-object retains part of the isomorphic character that it had in Aristotle, though now the emphasis is not in the continuity of human mind and world which makes the morphism possible, but in the power which produces the object in the mind, i.e. the power which produces the idea of the object. To such power he calls quality[80]. We could say that a quality is a morphic force in our mind that produces in us features of the objects. In relation to our mind, the features of the objects are called ideas. Those features are not in us prior to our encounter with the object, though the power to reproduce them is somehow imprinted in us. When the production is of ideas of movement, rest, number, solidity, figure and extension (basically Aristotle's common sensibles) the qualities are called original or primary. Any other production of ideas is due to the morphic action of secondary qualities, which are related to the workings of the particular senses (the blue color, the pleasant scent of a flower, etc.). For Locke the ideas produced by primary qualities (solidity, extension, figure, number, movement and rest) are indeed similar to such qualities in the objects, and could be called real, but not so to the secondary qualities[81] related to specific senses. Such postulate opens up a breach in relation to the objective world of final or literal representations which allows the emergence of a new psychology.

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[75] John Locke. *Essay Concerning Human Understanding.* Ed. Valentine Seaman. New York 1824. Treated in Chapters 2 and 3 of the First Book.

[76] He is not very precise about his terminology, using in a rather interchangeable fashion the words "idea", "notion" or "principle" (see Op. Cit. p.42). In any case, his use of the Greek expression *koinai ennoiai* when he introduces the term "idea" gives a clear semantic frame for the discussion of the problem of innatism.

[77] τὸ ὅλον τοῦ μέρους μεῖζόν [ἐστιν]. The whole is greater than the part.

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[78] See *De Anima.* 418.a.17 and 424.a.16.

[79] Ibid 425ª.28.

[80] Locke. Op. Cit. Book II. Chapters 7 and 8.

Within such conceptual system, Locke talks of emotions in terms of passions, which are related to sensation and reflection, the sources of all ideas through the power of the qualities. Sensations are the impressions made in some part of the body and are basically of pleasure and pain, which are motives for our actions[82]. Reflections are the ideas that the mind obtains not directly from the senses, but by operating upon its own workings.[83] Only the qualities which affect the sense are imaginable, and since qualities produce ideas, all our ideas are related to sensations, and therefore, all our ideas have a relation to pleasure and pain. Thus, pleasure and pain become some sort of universal language not only for the translation of our emotions but also for the translation of our ideas. In fact, for Locke pleasure and pain have been produced by primary qualities, something which implies that our passions have an objective origin in the mode of being of the universe,[84] insofar as qualities create isomorphisms of the objects in the mind. However, this system of propositions entails a rather curious contradiction, of which Locke does not seem to be conscious about. He sustains that human intelligence, as well as God's, seek happiness in a necessary manner,[85] but such assumption would render pain groundless, and also the notion of moral evil, since for Locke evil is nothing but pain. Indeed, if pain is produced from a primary quality, i.e. it is an adequate idea, it would be comprehensible by means of a simple idea, an idea which represents its archetype, as Locke puts it,[86] and that would imply the existence of an archetype for evil. If, on the contrary, pain and the passions associated with it were mere inadequate ideas (ideas which do not represent their archetype) of the subject, they could never be produced from a simple idea, as it was sustained. Now, how can the mind of God seek happiness in a necessary manner and still create the archetype of evil, linked to the general constitution of the universe inasmuch as it expresses isomorphically a primary quality? How can the mind of man seek happiness in a necessary manner and still produce the idea of evil as a simple idea?

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[81] Ibid. Chapter 19 and Chapter VII.3

[82] Ibid. Chapter I. 23

[83] Ibid. Chapter I.5.

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[84] Ibid. Chapter XX. 1-9.

[85] Ibid. II. XXI. 52.

[86] Ibid. II. XXXI.

Locke’s link of pain and pleasure to primary qualities grounds moral in cosmic order, but at the same time founds human emotions in a transcendent rational system. No matter that he differentiates three moral realms, the real of the Law of God, the realm of the law of politics and the one of the law of fashion[87], for such distinction makes relative the human claims for the universal validity of a given social order, but not for the grounding of emotions which continue to be a datum, a black box whose only key is in the hand of God. However, there is an interesting implication in the partial relativization which he does of the emotional workings of the human mind: the emotional grounds of personal identity, i.e. the relation of the persona to its actions and ideas. For Locke, the notion of *person* is not transcendental but forensic, basically the ascription of actions and their merits to an individual.[88]He specifically says *merits* and not *demerits*, for consciousness, from his point of view, is unavoidably concerned with happiness and not with pain, thus with a selective emotional action in which the person chooses from its experiences and constructs itself. As it could be expected, such recollection of emotions in memory, which give shape to the person, is linked by Locke to the Christian soteriological drama of sin and guilt, limiting the empirical dimensions that could be derived for psychology from his forensic definition.

Neither do we find in the philosophy of David Hume a more clear exposition of emotional psychology, despite his efforts to give an account of emotions from experience and not from traditional metaphysical reasons. Hume starts building his conceptual system from the notion of perception, distinguishing two species of them, impressions and ideas, according to the force or liveliness that they have in our minds.[89]While impressions can be sensations, passions and emotions, our ideas are the faint image of those impressions, used in thinking and reasoning. The mechanics of the process can be stated as follows: impressions strike upon the senses and the mind takes a copy, producing an idea; when that idea returns to the soul (for whatever reason) produces new impressions, which can be called impressions of reflection, and which in turn are copied in the mind to become new ideas. The first impressions of the chain are basic forms of sensation, heat/cold, pleasure/pain, thirst/hunger, whose arousal in the soul Hume declares to be of unknown causes, but then they become complex phenomena of reflection, in fact, of a recursive association which goes all the way back to the arousal of sensation but incorporating in its course all its partial associations; such phenomena is what he calls passions together with all the emotions resembling them.[90] Put in clearer terms, what Hume calls passions are those recursive chains taken as a set of associations whose final referent is a sensation. Since those basic pairs of sensations can be also described in terms of one which is even more basic, pleasure/pain, then we can interpretet and understand passions in terms of pleasure and pain. In Hume's system, passions are violent or powerful emotions, i.e. it is simply a difference of intensity, and can be classified as direct or indirect, depending on whether they emerge in a mediate or immediate manner from the pleasure and the pain (also treated as good and evil, in the manner of Locke)[91] which is in the natural disposition of the subject, and ultimately, incomprehensible to us. Pleasure and pain establish the limit of our knowledge of emotions, for little more beyond such reference we can venture using our reasoning powers. Though he recognizes that sensation obeys to natural laws, he confines their study to anatomists and natural philosophers.[92] In fact, since Hume considers that philosophy can only treat matters from the sphere of common experience, for our mind cannot form adequate ideas of things that are too big or too small,[93] there is little we can say about them outside this sphere, therefore they become simply a question of morals. For Hume, when passions depart too much from common behavior they become vices,[94]so the control of passions by custom and habit all is that there is for philosophy in relation to emotions.

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[87] Ibid. XXVIII. 13.

[88] Ibid.XXVII. 28.

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[89] David Hume. *A Treatise of Human Nature.* Oxford at Clarendon Press. Oxford. 1966. Book I. Part. 1. Section 1

[90] Ibid. Book.II. 1.1.

Hume knew that the conjoined postulation of God as cause of all things and of the natural origin of pain and emotional evil are inconsistent. Spinoza had resolved the matter by declaring the emotion as *causa inadequata* and removing the purpose from *Deus sive Natura*, which, by leaving aside the idea of a divine will, excluded the moral dimension of emotions, which was completely absorbed by metaphysics, whereas in the British thinkers the pragmatic dimension is not only the starting point of the philosophical reflection but the only one that is really penetrable by human understanding. For Hume, if God is finally responsible for the creation of evil and sin we step into inextrincable difficulties, and the only way for philosophy is to return, with suitable modesty, to common life.[95]It is interesting to notice that not for a single moment the logical conclusion to the puzzle is taken: that the system of moral theses of the soteriological drama is flawed and produces inconsistencies.

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[91] The direct passions are: pride, humility, ambition, vanity, love, hate, envy, piety, malice and generosity. And the indirect passions are: desire, aversion, suffering, joy, hope, fear, desperation and security. Ibid. II. Part I. Sect. 1.

[92] Ibid. Part. I. Sect.2.

[93] Ibid. Book I. Part 2. Sect.1.

[94] Ibid. Book II. Sect.1.

From the standing point of rational psychology, as well as from that of the so called *empiricist psychology*, emotions continue to be (from different assumptions) an object of ethics, and they are so to the extent that from each of these epistemological frameworks they are nothing but a chapter of a rational theological determination, regardless of whether this supernatural being which gives the ground for human and cosmic action is a god or matter itself, insofar as it is an exomorphic representation. Whether for ethico-political reasons or by the conditions of the soteriological drama the main frame of emotions within Western Philosophy continued to be century after century their social dimension: emotions relate to social actions of order and disorder, poorly understood beyond such frame, and none having the need for questioning further the subject. In part, this lack of curiosity, the absence of a bolder inquiry into their nature was a consequence of a very poorly understood human physiology, but also the inheritance of the contempt that emotions received in the agitated world after Alexander which drove Stoics and Epicureans in the direction of apatheia and ataraxia. The influence was still felt in Kant, who qualified the Stoic approach as sublime, and even tried to justify such principles in a sort of moral law which mirrors Newton's principle of inertia.[96] Furthermore, the lack of curiosity in relation to emotions was precisely related to their social action content, the close relationship which they have with the identity of the group and the individual, and the questioning of identity was and is a dangerous play of philosophy.

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[95] David Hume. *An Enquiry Concerning Human Understanding.* Oxford at the Clarendon Press. Oxford. 1894. Sect. VIII. 81.

It is not by chance that modern psychology could not start its development until freedom of speech and thought made way for conceptual frames that could operate outside the soteriological drama of Christianity. It seems obvious that in order to step out of the rational frame that was established since Aristotle, reason had to loose part of its unquestioned reign over philosophy and the structure of the universe. The way was paved by Kant's first critique, for it showed the limits of pure reason in relation to ontology and epistemology, but

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[96] Kant. *Anthropologie*. Op. Cit. #73. And # 74 in relation to the inertia principle. *Das Gefühl, welche das Subject antreibt, in dem Zustande, darin es ist, zu bleiben, ist angenehm; dasaber, was antreibt, ihn zu verlassen, unangenehm.*

Kant’s work in the moral realm retained all the traditional hindrances for a clearer understanding of emotions and the workings of life in general. The discredit of reason in relation to human life and the supposed order of the universe is already present in the work of the Church from its very beginning, but just to emphasize the centrality of the soteriological drama which, as we have seen, considered emotions as exomorphic representations. However, is not until such discredit is done from epistemological grounds that reason can stop being the grounding force of moral systems. This is done by Arthur Schopenhauer, who endomorphized reason by making it a representation for certain, but not all, workings of life force which he put in relation to a further exomorphism which he called *die Wille*. Die Wille is thus thought as the *thing in itself*, in the Kantian sense of the expression, something that can only be experienced as an inner direct and immediate consciousness, since it is the only concept which has not its roots in phenomena.[97] It is hard to imagine an inner experience which is not accompanied by a minimum representation, the slightest intuition of sequentiality, though Schopenhauer is basically saying that die Wille is an apeiron that we intuit as sheer life force. Every objectification of die Wille is a representation (Vorstellung) of it, and in this sense is a variation of the Kantian categories of substantia et accidens, for in Kant’s thought substance is a concept connected to action[98] and accidens to appearences[99] (Erscheinung) which under the schema of a concept become the representation of an object. The difference however is that for Kant reason is a problematic concept -for it produces the transcendental illusion-, though still in its critical and polemical use is the only tool at man's disposal to understand himself and the universe, while Schopenhauer denies even its practical use as a final epistemological instrument. In fact, for Schopenhauer reason is basically a property of the brain, which is the primary organ for thinking but not the only condition for life, so life could never be explained or fully understood from the grounds given by reason. As Schopenhauer noticed -following the psychology of Vedanta- the brain and our mighty reason are not at work while we sleep, and with a funny though inaccurate metaphor he compares the organ to a sort of minister of foreign affairs of the organism, a vedette established by die Wille for its external affairs.[100]For the Classical Vedanta of the Upanishads as well as for the Samkhya philosophy, the creative principle of the universe, Saguna Brahman (The Absolute as creator of the Universe) in the Upanishads and Pradhana in the Samkhya, is composed of three archetypal qualities or gunas which are in balance, being one of them Sattva, from which intelligence springs, but Pradhana or Saguna Brahman is not merely intelligence, neither Sattva is the central force.[101] According to

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[97] Arthur Schopenhauer. *The World as Will and Idea*. Vol. I. Trans. R.B. Haldane and J. Kemp. Kegan Paul, Trench, Trübner and Co. London. 1909. P.145.

[98] Kant Critique of Pure Reason. A 204.

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[99] See Ibid. First Analogy of Experience. A182.

[100]Schopenhauer. Op.Cit. Vol.2 p.463.

[101] There is a vast literature on the Gunas, both in Vedanta and Shamkya. A very good discussion on the Srutis (Scriptures) and the relation between the

Vedanta, the Supreme Being, Nirguna Brahman (The Absolute without attributes, or the Absolute in itself) cannot be ascribed any quality, neither intellectual (Sattva), volitive (Rajas) or vegetative (Tamas), neither one of these can be considered as central to the creation act of the universe. As a mediation between Nirguna and Saguna Brahman, between the Thing-in-Itself and the Creator of the universe, we can make a minimum representation through the concept of Shakti, or Will-Knowledge,[102]which corresponds pretty much to Schopenhauer's Wille. From such active principle, sprang all configurations of intelligence, and also the other gunas, so rationality is but another element in the workings and development of life.

Schopenhauer's metaphysics established the ground for a no reason-centered treatment of emotions which was alien to the no reason-centered soteriological drama of Christianity, for he placed instead of reason nor the otherworldliness of faith but the life of the organism as die Wille itself.[103] Life for Schopenhauer is an immediate objectification of die Wille and does not need the reasoning power for its apprehension, in fact, in self-consciousness the active force is die Wille, understood in the Vedanta sense of Shakti or Will-Knowledge. Emotions and passions are not under the control of reason nor

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concepts of Nirguna Brahman, Saguna Brahman and Pradhana in the *Brahma-Sutras* of Sankara. Advaita Ashrama. Kolkata 2001.

[102] As it is expressed by Aurobindo in *The Life Divine*. Chapter XIV. Sri Aurobindo Ashram. Pondichery (India). 2001.

[103] Schopenhauer. *Die Welt als Wille und Vorstellung*. Vol. II. Op. Cit.p.432.

that it is needed such control, for ethics is not based in the constructions of reason but in the relation which human actions have to die Wille: that which contradicts it is evil, while good is whatever makes its action stronger.[104] For Schopenhauer die Wille can and must be considered physiologically in order to fully understand it practical workings in relation to morals. He fully subscribed Xavier Bichat's thesis on the conditioning of moral life to physiology, and saw the thesis of Bichat as the physiological commentary of his metaphysics of die Wille, in fact, he considered that his thesis would be better understood if read together with Bichat's.[105]For Bichat, passions have their origin in what he calls *organic or vegetative life* and affect the functions of *animal life* or the organism considered as an entity with a nervous and locomotive system.[106]Morals are identified with the expressions of the physiological functions of vegetative life, and a full understanding can only be expected from their analysis. However, contrary to La Mettrie and D´Holbach, or Lamark, Bichat did not consider that physiological workings were machine-like. Physiology is not the physics of animals, for there is an enormous gap between physics and chemistry and life sciences, and it would be as imprecise as to say that astronomy is the physiology of the celestial bodies.[107] He uses the term *force vitale* in pretty much the same sense that Schopenhauer uses die Wille, so when Bichat says that mathematics cannot subsume under general formulae the actions of life[108]such statement gains meaning under Schopemhauer's Vedanta assumptions of the origin of intelligence and reason. Aristotle had already understood the difference between the objects of mathematics and those of the life sciences, but modern rationalism was too absorbed in the success which the science of calculus offer to the newborn science of mechanics to pay attention to the differences. Besides, the unification of human knowledge under one principle (in this case mathematics), even at the price of reductionism and over simplification, never seemed too big a problem for modern science. Bichat-Schopenhauer's theses of irreducibility of life force (Wille, Shakti, force vitale) to reason, what later was to be called *vitalism*, was the first proposal for the grounding of emotions and moral actions on a life science which obeyed to its own principles. Emotions did not answer anymore to principles outside life, whether to those exomorphisms of faith and salvation plans elaborated by a universal religion, or to those, no less transcendental and no less exomporphic, of the forces of reason and cosmic order. Schopenhauer's Vedanta principles synthesized the transcendent and the immanent, making life divine, though not in the happy terms of an ordering reason which finds a place for everything in the plan of the universe, but instead, in the unheimlich realm of a universe which is rather indifferent to human life, a Brahman that in its aspect of creative life force (Saguna Brahman, or Absolute with attributes) is a self-absorbed principle -from the perspective of Christianity, an egoistic force-, which proceeds by self-perpetuation.

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[104] See Schopenhauer, *The Basis of Morality*. Part III. Chapter V. *Statement and proof of the only true moral incentive*. Swan Sonnenschein & Co. London. 1903.

[105] *Die Welt als Wille und Vorstellung*. Vol. 2. p.p. 489-490.

[106] Bichat, Marie François Xavier. *Recherches Physiologiques sur la Vie et la Mort*. Brosson et Gabon. Paris. 1805. See *Article Sixième*.

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[107] Ibid. p. 78.

[108] Ibid.p. 75.

Since our knowledge begins by establishing endomorphic representations for the literal or exomorphic representations, i.e. inscribing the unknown and undefinable in our semantic Lebenswelt web, changing the center of the conceptual system from reason to life was a mere swap in exomorphic representations. Reason was as unknown as life, but both had an operative Lebenswelt meaning, transcendental in origin, for the concept of reason was the specific difference of man in relation to animals. The problem was now the creation of an adequate representation for life as an action independent of the traditional metaphysical frame which simply considered it as the result of the creative work of God. Emotions could then be defined as its dynamics. Bichat defined life as the set of functions that resist death,[109] i.e. as a specific difference to the genus of inorganic or non-organized matter. Organic bodies are continuously in the brink of destruction by everything around them,[110] they exist as an unstable system of particular functions of order. Implicitly Bichat grounds his definition in a principle of order which produces and maintains the functions which characterize life. The concept of order is not defined, it is an exomorphism, *l'ordre naturel*, for Bichat has not any conceptual means to go beyond such an exomorphism, which would require the science of thermodynamics in order to become endomorphic.

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[109] Ibid. Art.1. p.1.

[110] Ibid.

Jean-Baptiste de Lamark continued with a physiological definition of life which emphasized the particular character of the living being as a consequence of a principle of order at work. Life is a series of phenomena which occur during a limited time in organized bodies,[111]a system which can be described by the relations between three objects: the containing parts, the fluids that they contain and a cause which excite those fluids.[112]Lamark is closer in many respects to the mechanistic principles of D'Holbach and La Mettrie in relation to life than Bichat, for Lamark considered that life workings were basically mechanical, despite the gap that exists between organized and inorganic matter.[113]More precisely, Lamark's definition of life is systemical, the result of a set of objects and its relations. The procedures of the system are rather mechanical but more in the sense of complex formal and teleological causes that mere material and effective machine workings. Lamark emphasis in organization requires the notion of a creator (Auteur) of life, though now is an abstract universal law responsible for the order of the cellular processes, which are no different from the principles that organize the rest of the world. The link between organic and inorganic is the dynamics of fluids, that should provide the account for the physiological functions.[114]It is interesting to notice that he called *faits moraux* to mathematical truths, for the results of calculi and measurements are known to us by intelligence and not by sense.,[115]proclaiming thus not only the unity of the organic and inorganic realms but also of the ethical sphere under the rule of intelligence. The will becomes once again a property of intelligence, united to the conscious willing capacity, common to all complex animals; intelligence and emotional workings can be fully and satisfactory explained with the very same moral facts (mathematics and thinking processes in general) which are at hand. However, in relation to the nature of emotions, Lamark's most interesting development is the link that he established between the particular organization of the living being and its environment: circumstances change needs and needs change actions.[116]The operative for changing organic actions is the repetition of behavior or habit, a fact which implies a very interesting relationship between emotions, environment and survival that was never developed by Lamark and will have to wait for Darwin's work.

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[111] Jean-Baptiste de Lamark. *Philosophie Zoologique*. Dentu. Paris. 1809. p.400. He uses the definition of Anthelme Richerand,

[112] Ibid p.401.

[113] As he does in Ibid. p. 92.

The autonomy of the study of emotions with respect to transcendental rational ethics underwent a parallel process through aesthetical thinking, following the relatively independent development in art which began with the Renaissance. Though European art and aesthetics were developed as an appendix of transcendental Christian ethics -in most cases indistinguishable from the cult and rites-, emotions not only became increasingly more complex through art but also claimed an independent sphere which was in fact to substitute partially the functions of metaphysical thinking and religious experience, a process which culminated in the avant-garde art of the XX century. We observe it in the emotional aesthetics of Rousseau, which defined in rather Pascalian terms an epistemology of emotions, but especially in the German Romanticism, which claimed an anthropological general domain for emotions, and a deeper definition of the human being in emotional terms. The process culminates with the separation firstly of the spheres of theology and psychology, as proclaimed by Feuerbach, Marx and other leftist Hegelians, and later with the independence of art from a psychology which increasingly was becoming more empirical and complex as a consequence of the development of life sciences. However, old inertias of metaphysics of the universal law were maintained. Whereas Schiller's idealism led to a new theologization of aesthetics, in the manner of Hegel or Schelling, Feuerbach's naturalism proposed an emotional and anthropological psychology: a new philosophy based on love, on human feeling exalted to a conscious act, not as something abstract and metaphysical but as a concrete and sensual experience.[117]Feuerbach's program is the dissolution of theology into anthropology, curiously enough, grounding such anthropology in the Christian myth of the God that is also man, only to declare the human god.[118]

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[114] See Second Part. Chapter 2. *De la Vie*.
[115] Ibid. p.xx.
[116] Ibid. p.221.

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[117] Cf. Ludwig Feuerbach. *Principles of the Philosophy of the Future.* Hackett Publishing Company. Indianapolis (IN) 1986. No.34.
[118] Ibid. No.2.

Following on this line, the subsequent philosophy of Nietzsche, whose symbolic naturalism is a synthetic recapitulation of the Enlightenment and the Romanticism, entails a liberation of the treatment of emotions from the field of morals, it is an anthropology *beyond good and evil* founded upon the emotion of self-stimulation or desire, the will to power, which subverts the values of traditional epistemology and with them those of traditional ethics. For Nietzsche, emotions have autonomy in relation to reason, and precede it in physiological terms. Mind is only a means and tool in the service of life,[119]a Schopenhauerian affirmation which Nietzsche intends to transform in a proclamation of life as the ultimate value. Nietzsche's theory of emotions is not merely an extension of Schopenhauer's, neither of the aesthetical proposal of the realm of emotions as the true nature of man as proposed by Rousseau and the Romantic view. The romantic pose of modern man, as he calls it, is just the XVIII century of Rousseau,[120]a sensualism which reduces life to problems of pleasure and displeasure. It is interesting Nietzsche's examination of emotions in physiological terms, as expressions of healthy organic functions which need to be acted and expressed. He constructs a new morality in which virtues are really refined passions,[121]a very interesting proposal in which not only morals are linked to the living processes –something already stated by Bichat and Schopenhauer-, but also morals are presented in naturalist terms as developments of emotions. For Nietzsche, the will to power is the primitive form of affection (Affekt-Form) and the other emotions are only developments of it. The thesis of a handful of emotions which originate the others is -as we have already seen- a common trait of emotional theories, for the need for a small number of principles is a trait of all rational thinking. In Nietzsche's terms, pity and love of mankind are, for instance, a development of the sexual drive,[122]i.e. they are refined emotions which started from the basic sexual drive getting more complex in the milieu of social communication and survival, and the sexual drive would be a more refined form of the will to power. Emotions and morals are therefore valuations of the conditions of a creature's life, a valuation done from the perspective of the preservation (Erhaltung) of the individual or of a community.[123] Furthermore, since our valuations are conditioned by preservation, emotions are also instruments for controlling the stability of the group. Life is thus a play of emotions and our understanding of the world is completely tinged by them. Emotions are conditions for our preservation, they are those valuations which have successfully contributed to our survival. Thus, our survival determines completely our morals and our metaphysics: we have projected our particular conditions of preservation as predicates of being in general.[124]However, the refined human emotions, though based in the basic physiological movements, are constructions of our intellect,[125]interpretations of physiological causal chains under cultural patterns, i.e. under morals, but they are based on psychological falsity and opacity in order to maintain the power hierarchies.[126]

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[119] Friedrich Nietzsche. *Der Wille zur Macht*. 644. Alfred Kröner Verlag. Leipzig. 1922.
[120] Ibid. 62.
[121] Ibid. 255.

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[122] Ibid.

[123] Ibid. 256 and 258.

[124] Ibid. 507.

Nietzsche is not a Darwinist, preservation is a symptom of the movement of the will and not an end for it, a thesis that would imply in relation to emotions that they neither offer an accurate picture of the will nor of the world. Accordingly, the will to power as *primum mobile* is not a teleological principle but rather a simplistic arbitrary expression of force, and thus, unintelligible. At this point, Nietzsche's epistemological insights on emotions become destroyed under the action of the principle of the will to power. His whole system collapses under its weight, for the lucid relativistic stand proposed about emotions and morals is completely absorbed in the non-teleological movement of the will to power. Human actions are meaningless both in ontological and epistemological terms beyond their mere expression of the omnipotent will to power. This new form of nihilism, a new Brahman force which absorbs all manifestations of the universe under its misterious spell, is not even related to life, for life works according to goals and purpose, opening a gap in the relation of our thinking and living nature to that of the universe no different to those of the traditional universal religions. Unlike Spinoza, Nietzsche does not offer (beyond the nightmare thought of the eternal return) a bridge between the teleological domain of life and the purposeless will to power. A simple solution to the gap could have been the postulation of the telos of self-preservation as a blind inertia of life, and not as a consequence of the will (like life itself seems to be), but he opted for making the actions of preservation a mere symptom, an epiphenomenom of the unthinkable actions of the will to power. Self-preservation as an inertia movement does not imply a telos outside life. Once life processes are set in motion by the concurrence of different chaotic circumstances, the equilibrium of the organism can be easily explained as a self-perpetuating sytem in merely physical terms. At this level, purpose and no-purpose are useless concepts which do not explain anything at all. Neitzsche’ aesthetics of the genius conditioned in this respect his Weltanschauung, and in order to maintain the *erste Bewegung* metaphysics of the creator (Zarathustra) he has to establish a cosmological game of will-to-power outbursts needed for his religion of genius.

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[125] Ibid 670.

[126] Ibid. 726.

On the other hand, the precedence in humans of will to power with respect to reason, as well as the possibility of its cognitive superiority –two assumptions which underlie Nietzsche’s proposals-, is not only questionable, but in fact mere nonsense. If all emotions are developments of the will to power, if all life is an expression of such will, reason cannot be but a specific development of it, a very useful and strong tool for survival, so the idea of precedence is only of genetic use (describes a precedence in time) but it is meaningless to say that the will is superior to the intellect as epistemological tool,[127] for there is only episteme as long as there is an intellect working in favor of the survival of the organism.

Whether as an appendix of naturalist onto-epistemology or as a prelude for psychoanalytic psychology, Nietzschean anthropology supposes the limit which philosophy encounters for an autonomous treatment of emotion in mere rational speculative terms (a beautiful paradox of Nietzsche's work: an anti-rational philosophy expressed through the inevitably rational means of human language, though aspiring to express by sympathetic vibration a glimpse of the *hinterwelt* realm of the will to power). The link established by Nietzsche between emotions and survival would have to wait to the end of the XX century for an empirical confirmation by affective neuroscience.

A parallel development of vitalism was undertaken by Wilhelm Dilthey who, from a humanist perspective, proposed a psychologization of the human experience in which rationality was no longer the sole condition of intellection, but a tool within a vital network in which will and emotion also intervene. Psychology insofar as it is the most basic and the first of the sciences of the mind, is the foundation of historical life. From psychology emerge all the rules for the guidance and development of society, but it is a science which is exclusively human and rational, since nature is something foreign to us, something external.[128] Dilthey's psychology renounces to the new perspectives that life sciences were opening on emotions, for he establishes an unsurmountable gap between nature and human life. The world of the human being is the social and the historical, not the natural, a proposal which implies that any treatment of human emotions makes only sense under the perspective of *Geisteswissenschaften*. Psychological objects are defined socially, with meanings formed in the vital processes that constitute historicity, so there interest resides in their cultural function. Although Dilthey proposed a systemic integration of thought, will and emotion, under the unity of some psychic and psychophysical principles,[129]such a system is a mere cultural description in which nature, the physical medium, does not have any exomorphic content, in fact, he considers that the physical causal chains cease to make sense in the psychological plane, moreover, that the psychological plane changes such a causality.[130] In this context, it makes no sense to talk about emotions, but instead, about facts of ethical historical consciousness, which are part of a non-analyzable conceptual unit to which he calls *Erlebnis,* or vital experience. The *Erlebnis* or *innere Erfahrung,* internal experience, is a kind of internal immediate consciousness that takes place through the total activity of the mind when it is put into contact with the world, an internal experience that makes science and moral possible.[131] The concept of *Erlebnis* functions, thus, like a literal or exomorphic representation both for the economic and the ideological determinations of society, allowing an anthropological foundation which, by not being naturalistic, reifies and divinizes human history. A non-naturalistic anthropology makes nature unintelligible and the human being himself, for it isolates him by declaring him epistemologically self-contained, and forces psychology to a mystical introspection that ignores the physiological basis of its self-absorption. In its practical use, psychology describes and unifies from such description the relationships that art, science and religion have with the *Erlebnis*, becoming the tool for the construction of the modern moral world. Man not only becomes alien to nature, but to himself, so it comes as no surprise Dilthey's ineffability principle: *individuum est ineffabile*, a variation of the traditional *Deus est ineffabile* which abruptly interrupts any interest in endomorphizing emotions, now from a pseudo-humanist perspective which revitalizes the transcendental views of Schelling and Hegel. In Dilthey, we can overhear the harmonic resonances of the German romantic poets, with their appeal to the wisdom of feeling as the expression of the ineffable realm of the human soul and God.

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[127] The whole Book Three of *Der Wille zur Macht,* is based on such assumptions.

[128] Cf. Wilhelm Dilthey. *Introduction to the Human Sciences.* Wayne State University Press. Detroit. 1998. p.p.94-95.

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[129] Cf. Dilthey. Ibid. p.102.
[130] Ibid. p.85.
[131] Ibid. p.159.

A variation of the Diltheyan *Erlebnis* is found in the thought of Scheler, who also openly postulates a transcendental psychology, which is not even subjected to the conditionings of logic. To Scheler, the units of meaning and the propositions immediately related to intuition are a priori. Furthermore, they are independent, at the same time, of any thinking subject and of any object to which such units and propositions could be applied.[132]Such declaration of a universal immediate episteme of transcendental character links human thinking to the structure of things, a reality which is proclaimed as a monolithic entity of semantic nature independent of life, though connected to man's power for creating and communicating meaning. Scheler reexamines Pascal's ideas about the *order of the heart,* in order to sustain that feelings, preferences, love, hate, will, have an aprioristic content which is independent of reason.[133] Thus, emotion not only revalidates the transcendental content that had in the metaphysics of traditional religious systems, but it also obtains a philosophical validation of its epistemological character beyond the proposals of Spinoza. Indeed, while in Spinoza emotions (as activities) were adequate ideas, but still unable to perform they were insufficient for the third kind of knowledge which united man with the intellect of God, for Scheler emotions are semantic units which immediately give us the meaning of the universe. Following dogmatic metaphysical propositions, without any basis whatsoever on an experimental psychology, he sustains that the spheres of logic and emotion are independent. The separation of logic and emotions is made by means of a *demand* for the revision of the link between apriorism and reason,[134] in order to reclaim such apriorism in favor of emotions. The transcendental content of emotions makes them the valuation referent, and for this reason, the referent of all knowledge, now expressed as *sittliche Erkenntnis*, moral knowledge, which occurs as a consequence of the special immediate semantic character assigned to intuition. The system is sustainable only through an appeal to a non-rational form of causation: to the magical principles of causality by sameness and association, and causality by contiguity or solidarity. Thus, Scheler proposes a pre-philosophical causality concept. To Scheler, the changes in the subject are due to associations by contiguity (the principle of solidarity that we already saw for magical causation), understanding this association as the relationship that a living body has with all that surrounds it.[135] Scheler tries to ground the relationships of the subject with the objects that are contiguous to it in an objectual sameness which retrieves memory within a unity of situation,[136] a psychological unity that includes the processes of object retrieval in memory based on the valuations that are relevant to the subject in its here and now, that is, a constellation of consciousness which is similar to another constellation of consciousness. These association principles occupy an intermediate position between the contents of pure intuition, which Scheler understands as the incorporeal intuition of the subject and nature by the immediacy of the semantic a priori character of intuition, and the factual content that a spirit connected to a body in a determined manner has, i.e. what we would call its past experience.[137] The transcendental mimetic proposal is a revitalization of the Platonic one to which it has been added the entire dimension of the Christian *Erlebnis,* emphasizing the value of the individual experience of these transcendental intuitions, in the unique determination of the here and now as the moment of the moral persona, in which the constellation of sameness is freely determined by will. The conceptual edifice thus leads us to the instant of the moral election which in mythic terms was already postulated by Zoroastrian religion (in its vote for changing the earth and fighting Ahriman), now re-exposed in terms of a phenomenological Christianism, of the salvation by means of the adequate action and the adequate thought (in clear resonance with the Zoroastrian Amesha Spentas). Such a theologization of causality in magico-emotional terms emancipates ethics from reason in order to leave the former within the sphere of religious emotionality, even though it does not justify at any moment the link of emotion with transcendental forms, in the same way that it does not explain the mechanisms of memory and cognition, which are still a black box in whose extremities we can connect very different theories with the same degree of intelligibility. Thus, for instance, we could substitute in Scheler's doctrine the transcendental referents for biological ones and obtain an equivalent system in relation to its praxiological dimensions for the construction of a moral persona, although these praxiological dimensions would not be isomorphical in function to his religious constructions related to the salvation of the individual. However, Scheler's system has the interest of considering emotions as a priori conditions of our vital experience (though he grounds it on transcendental terms), as processes that are found at the basis of valuation and that act independently of rational processes. Curiously enough, the proposal is pretty close to Nietzsche's though thought from a diametrically opposed onto-epistemology, an agreement which shows some common grounds for a general thinking on emotions, since their valuation function seems to be independent of the ontology we adopt. Such theses will be adopted in this book although devoid of their transcendental content, whether Nieztschean or Schelerian, and understood in evolutionary terms.

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[132] Cf. Max Scheler. *Formalism in Ethics and Non-Formal Ethics of Values.* Translation by Manfred S. Frings and Roger L. Funk. Northwestern University Press. Evanstone. 1973. p.48.

[133] Ibid. p.p.63-64.

[134] Ibid. p.p.64-68.

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[135] The expression he uses is that of *live body*. Cf. Scheler. Ibid. p.452-474.
[136] Cf. Ibid. p.471.

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[137] Ibid. p.474.

Scheler's theologization reinstates emotions as final exomorphic representations, pretty much in the tradition of Medieval Christian authors, though taking out the soteriological drama of salvation and the problem of evil. The human being is to Scheler life and spirit (a concept which he identifies with "higher forms of consciousness"),[138] a double essence whose antithesis reaches the *Ground of All Things* deeper than any other[139] -or than any rational action-, an antithesis which, ab initio, is intractable by reason, and that leaves reason itself out of the discussions about a *Foundation* thus intuited. Scheler's theses are no less a dead end for the treatment of emotions than traditional rational psychology was, thus forcing any subsequent development of research to a choice between two possible alternatives. We either study both emotional and rational physiology under the light of the ontoepistemological schemas implied by life sciences at their present estate, that is, we bare reason and emotion of their pretensions of reciprocal cognitive supremacy (irrespective of whether we base reason upon transcendental or material principles) and establish the limits for emotion and reason in anthropological terms, or we make a philosophy of language in which we take emotions as self-contained objects of our psychological moral life, objects which have an autonomy with respect to physiology, although they may have links with it, from which we can have all the relevant knowledge by means of games of linguistic clarification and elucidation. In other words, we either open our minds to what physiology -especially neuroscience- has to say about reason and emotion in the context of all life (not only in human terms), or we ignore our relation with the rest of nature and determine an a priori specific difference of human nature and continue treating emotions in traditional terms of morals according to the wits of the philosophy of language and proper customs. A third way, the Nietzschean proclamation of independence of the will, was taken by the artistic avant-garde in different variations, but beyond a new sacralization of the artistic genius it has proven to be a dead end in the understanding of emotions, for they have been reduced again to their moral content within the political frames of the modern city. Art develops emotions, for it uses emotions as data or material for the craft, but it cannot give any answer about the nature of emotions for it is always conditioned by a mythology which determines its position and function in relation to the life of the social group. However, since we observe in the different treatments of emotions exposed herein a clear and common process of Mythologization, Nietzschean liminal theories may act as aesthetical or artistic limitations to the two aforementioned ways. Thus, as a Nietzschean objection to the first path (opening emotions and reason to modern physiology research) it can be said that we simply pretend to give an Apollonian image of the undifferentiated Dionysian, which is nothing more than a dream: we simply obtain a rational simulacrum by which we believe to be saying something. As an answer to such an objection we could allege that in order to understand emotions and reason from a non-metaphysical viewpoint, it is necessary for them to cease to be final representations, thus needing new representations that may serve as common referent. Moreover, we could add that the mythologization processes, the construction of new exomorphisms and the transformation of literal representations into metaphors (whether supernatural or natural) –as historical experience shows us-, they are inevitably processes of rationalization, for they imply a symbolic complexification. On the other hand, as a Nietzschean objection to the second path, it could be said that an analysis of language which considers emotions as self-contained objects of our psychological experience cannot show but an archeological collection of old epistemologies, merely the archaic mythical grounds of our values. Thus, for example, if we accept Moore’s theses which maintain that philosophy should be in charge of studying common sense propositions,[140] despite the obvious fact that they cannot be proven nor refuted, for they express an ontological stand, we are simply reproducing with our acceptance an ontoepistemological error that was obscurely initiated in Aristotle and culminated by the Scottish School of philosophy,[141] appealing to a Lebenswelt solution to cover the empirical wanting of their theories of perception. Applied to emotions, the theory of common sense, which advocates that common sense is a kind of faculty that perceives truth in an instinctive way -directly or instantaneously-, implies the return of the study of emotions to its old house of ethics and Lebenswelt social experience, in the best British tradition. Moreover, such a definition of this faculty entails the need to recuperate some of the most naïve principles of the Aristotelian theory of perception which assumes that we perceive objects as they are. The problematic here is not that of merely obtaining a consensus (for more than a definition we should seek a consensus for the term, if we must start from such a property as *the social common*) about the concept of *common sense* -in any case, an object as ineffable as the final referent of Moore's ethical judgments-,[142] but that merely by postulating its existence in human praxis, we are defending an spontaneous capability of infallibility in the human being as absurd epistemologically as is contrary to the experience that our past and our present show. To say that common sense is infallible would imply that the continuous sequence of social atrocities which constitute human chronology express some sort of deep wisdom, furthermore, it would imply an absolute human referent that determines the reality of things, for it implicitly proposes a naïve theory of conceptualization which, as a result of not employing any concept of the life sciences (Überlebenswelt), is merely a metaphysics of the *folk-wisdom* that ignores the dynamics of the mythologization processes. What today is common and a metaphor, it was an exomorphism in the past: the exomorphic representations, both for the narratives of identity and for the narratives about economic activities, are not permanent.

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[138] Cf. Scheler. *The Human Place in the Cosmos.* Trans. Manfred S. Frings. Northwestern University Press. Evanstone. Illinois. 2009. p.60.

[139] Ibid. p.57. Capital letters are Scheler's.

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[140] See G.E. Moore. *A Defense of Common Sense.* In Weitz, Morris. Editor, *Twentieth Century Philosophy: The Analytic Tradition.* The Free Press. New York. 1966. p.p.99-123.

[141] I refer to the school initiated by Thomas Raid in Aberdeen in the middle if the 18th Century. It is a form of empiricism that follows Hume.

[142] The matter of ethics, says Moore, is an undefinable object of thought and not analyzable. (Cf. *The Subject Matter of Ethics.* In Weitz, Morris. Editor. *Twentieth Century Philosophy: The Analytic Tradition.* Ed. Cit. p.85.)

If we are conscious of the difficulties that the traditional expositions concerning emotions have encountered –the meager explanatory success, and the contradictions of rational psychology and transcendental emotional psychology- the only path remaining for us untrodden is the one that was open with the so called experimental psychology in the 19th Century. The metaphysical burden that the birth of modern psychology suffered was no different from that of other sciences which emerged under the wing of philosophy in different historical moments. With the absence of life sciences based on naturalistic and evolutionist premises, psychology could not come out of its rational-metaphysical conditioning which relegated it to the onto-theological world of the relations between a universal essence and a particular human existence.

The results offered by life sciences during the 19th Century opened new perspectives about the place of the human being in the universe, entailing a direct threat to the theological view, which constituted the backbone of social order, and psychology had to suffer such a tension when elaborating its theories.[143] The crisis can be observed in the convulsions of the philosophical thought at the end of the 19th Century and the beginning of the 20th Century. The plan for the independence of psychology had already been laid out by Kant in *Die Architektonik der reinen Vernunft,* when he proposes the expulsion of empirical psychology from the metaphysical sphere, who has been living during a long time in its house like a friendly foreigner to whom shelter has been provided until he can find his home in a whole anthropology,[144] a metaphysics which to Kant was (or should be) most of all a rational propaedeutic that could censure the possible errors of the sciences. Under these circumstances, the independence was, obviously, relative, for a censure of the incipient empirical psychology from the point of view of old rational psychology, as metaphysical ethics, conditioned any investigation to the fixed scheme of a transcendental order of the universe. For this reason, it did not suffice a mere empirical approximation to psychology, like the one undertaken by Wilhelm

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[143] William James himself, one of the most active thinkers of the new psychology, suffered a profound emotional crisis due to the conflict between the determinism of natural sciences and the idea of free will, a crisis that he could only solve by appealing to a faith in liberty.

[144] Cf. Kant. *Critique of Pure Reason.* Cambridge University Press. New York. 2000. A 848-849.

Wundt, or the evolutionary postulates of the functionalism of John Dewy and James Angell, but it required an unequivocal knowledge of brain physiology, a neuroscientific approach that could begin the undoing of some of the fundamental inconsistencies that entailed the methodological approaches of traditional rationalisms (transcendental, empiricist and materialist). The subsequent behaviorism[145] was shown insufficient to cover the empirico-deductive psychological program that it had laid out for itself, since it was incapable of covering the double conceptual abyss opened between the concepts of *stimulus* and *response,* and the concepts of *reinforcement* and *resulting behavior change,* abysses produced by a treatment of the brain like a *black box* and which, as Skinner pointed out, had to be covered by neurology.[146] Watson's or Hull's behaviorism, inheritors of old XVIII century mechanicism, opened the field for artificial intelligence, but by ignoring the physiological workings of the brain they were incapable of elaborating explanations beyond the limits of the experimental conditions of mechanized learning.[147] And something similar can be said about the first *cognitive science,*[148] whose mechanistic emphasis in the line of John Von Neumann, proposed general epistemological trivial models on the biochemical workings of the brain, which was considered, like today is still considered by cognitive science in greater or lesser measure, as a particular case of the functional architecture of a symbolic machine.[149] It was not enough the treatment of the brain as a *black box*, for it avoided the problem of the psychological foundation in exchange for a relative operational success in the determination of some experimental patterns of behavior, a treatment that was unavoidable until the development of the experimental techniques of the last quarter of the 20th Century, which finally allowed to observe the brain's biochemical functioning in relation to different emotive and cognitive processes.[150]

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[145] In the works of John Watson and Clark Hull.

[146] See the letter of B. F. Skinner to Jaak Panksepp, in Jaak Panksepp, *Affective Neuroscience: the foundations of human and animal emotions*. Oxford University Press. New York. 2005. p.12.

[147] Clark L. Hull follows the theories of logical positivism, and his man work in the 1930's decade takes place around the thinking machines. His orientation, highly valued at the time, is made clear in the title of one of his books, *Mathematico-Deductive Theory of Rote Learning* (1940).

[148] Ulric Neisser writes *Cognitive Psychology* in 1967 (Appletone-Century-Crofts. New York. 1967.), in which the cognitive labor is reduced to a logical processing of information. A more complex model is found in the

Any treatment of emotions that leaves out neuroscience cannot but repeat the psychological paradigms that religious mythology and philosophy have elaborated up to present

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cognitive theory of the 80's decade of Zenon W. Pylyshyn, *Computation and Cognition,* whose orientation is still being, however, purely *syntactic.* See *Computation and Cognition: toward a foundation for cognitive science.* MIT Press. Boston. 1986.

[149] An example of this is the work of Von Neumann, *The Computer and the Brain* (1956), in which the comparisons between brain and computer, are based upon a knowledge of the brain that has passed from being a simple *black box,* to be a *black box* that has a high number of connections of neural cells. See the comparison of the second part. John Von Neumann. *The Computer and the Brain.* Yale University Press. New Haven and London. 2000.

[150] Such as the electronic microscope, the electro and magnetic encephalogram, computerized radiography (CAT), the scans of the brain by means of positron emission tomography (PET) techniques and by functional magnetic resonance (fMRI).

times. Our art and our metaphysics are the monuments erected over such mythic pillars, but none of them resist an analysis that excludes its traditional transcendental concepts, such as that of *genius* or *divinity,* for instance, without collapsing rowdily beyond a theory of taste or an appellation to the inscrutability of *das Heilige.* If we aspire to explain the human being outside the traditional ontoepistemological framework, it is obvious that we can start from biological and neurophysiological concepts that serve as foundation for the rest, but where do we ground these latter concepts? As philosophy knows since Aristotle, any system of thought possesses a set of elements that are undefinable, from which the rest are determined.[151] Obviously, neither biology nor neurophysiology would make any profit from having a set of primitive or indefinable concepts in their ranks. In fact, life sciences by being placed at an intermediate link in the scientific knowledge chain taken as a whole, with chemistry and physics covering their back in relation to any regression directed towards providing a first *material* link on which to ground the knowledge of what we call the natural world, psychology has the luxury of being able to operate without indefinable concepts of its own.[152] In other words, psychology can always apply the principle of reduction of its fundamental concepts to other sciences, or to philosophy, and operate as a necessary link amongst these sciences, incorporating thus in the epistemological discourse the social living being who feels, thinks and creates theories, politics and art, under determined biological and environmental conditions. Psychology, assisted by the rest of life sciences to avoid a methodological circularity,[153] can perfectly leave the indefinable concepts to epistemology, something that does not prevent it from studying which parts of the brain are dedicated to elaborate the mental processes that we interpret as epistemological thinking, and which has been the function of this type of thinking in the development of the human being. As Wundt already sustained, there could be no single natural phenomenon that could not be transformed into an object of study for psychology if we were to change the point of view of the investigation.[154] Thus, for instance, the emotions that psychology studies are also the object of literature, and any literary appraisal is already, among others, a psychological appraisal. But a psychological study of the *Iliad*, for instance, offers perspectives whose relevance goes beyond the artistic world. In fact, what psychology shows, as the Greek philosophers had already proposed, is that there is not an isolated sphere of human knowledge as such.

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[151] Aristotle, *Posterior Analytics.* 71 I-77.

[152] Even though in practice it has used them: from the concepts of *soul* and *unconscious,* to those explicitly indefinable of which C. L. Hull speaks of in his *Principles of Behaviour* (Hull, C. L., *Principles of Behaviour. Appleton-Century-Crofts.* New York. 1943.)

Any treatment of emotions that may still consider the brain like a *black box*, whether from the points of view of the Hermeneutic tradition, of the Marxist tradition, of Functionalism, of Behaviorism or from diverse sociological perspectives, cannot but offer a variation of the rational metaphysical perspective, whether from more or less transcendentalist or materialist standpoints, in which reason is an exomorphism barely definable from the commonality of the cognitive operations of the *Lebenswelt* or from the ones formulated by science itself (what it is provided by the use of reason in scientific systematics and social praxis), but not in relation to the processes of organic development in the biophysical environment, which implies that we are never considering our cognitive abilities based on the vital phenomenon from which they have emerged. But, what can we expect from neuroscience? Are we not equally assuming emotion and reason as exomorphic elements? An exomorphism, like that of *reason* or *god*, cannot be contained into another concept if it wants to maintain its condition of literal reference. If neuroscience explains emotion and reason based on the general phenomenon of life, then, these will have an external conceptual referent, with respect to which they will be endomorphic. It is obvious that neuroscience follows the rational method in its procedures, but this method cannot be understood as something extraneous to life without applying the old transcendentalist theses. From an evolutionary point of view, reason (as understood by philosophy) is an emergent phenomenon within life. The vital process gives the conditions of possibility for the self-reflective study of reason; by studying it (obviously from our cognitive tools) we gain information about the former, and merely by the fact of establishing the differentiation-determination of an external referent to the reasoning action that until recently appealed to supernatural beings or to a naïve material mechanics. The fact that reason and emotion have an interest to us (in such a persistent manner) is proof that we are doing a vital action from which we have acquired a benefit: a better control of the world through narratives of identity which operate favorably for such dominion. Neuroscience then allows us to establish a new exomorphism, not only on emotions, or on reason, but on the phenomenon of life, such a change in perspective allows us to establish a continuum of life-intelligence in which our symbolic narratives of identity have their roots deeply grounded.

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[153] For instance, like the fact that we study the processes of rationality in the brain following a rational method.

[154] Cf. Wilhelm Wundt. *Outlines of Psychology*. Translated by Charles Hubbard Judd. Wilhelm Engelman. Leipzig, London & New York. 1897. p.2.

1.2 Evolutionist Perspectives

Barely a hundred and thirty years have passed since Wundt's rejection of the *innere Wahrnehmung* -the traditional philosophical internal perception as a psychological method- in favor of the *experimentelle Selbstbeobachtung*[155] -or experimental self-observation. However, during this time, we have witnessed not only the birth of genetic science, which has completely changed the vision we had of physiology, but we have also experienced a general scientific revolution -in the sense of Kuhn-, in which we have altered our general understanding of life sciences. The theory of the animal organism as a dynamic system of proteins[156] that emerges from a specific physico-chemical environment which is in a continuous interaction with it, has allowed us to elaborate theoretical models in which human life is entirely integrated into the general biological process of the planet, without the need to appeal to supernatural hypotheses. This new myth has introduced more precision and coherence to the rest of scientific knowledge, and in the neurological plane, it has allowed the first integrated model of brain activity within the joint system of organism and environment, a model which can be projected over the old terms of introspective psychology.

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[155] Ibid. p.p.18 and s.q.

[156] According to the current estate of the research, the human body has around 10^4 types of different proteins and a total of 10^{22} proteins. Proteins are precise molecular machines that can detect, unite, transport and modify other molecules. See Müller-Esterl, Werner. *Bioquímica.* Ed. Reverte. Barcelona. 2008. p.p.77-103.

I do not mean to say that a description of man from the processes of proteins and macromolecules can suffice to characterize us: it could never be inferred from the mere biochemical interactions, for instance, an orchestral piece, or the idea of democracy, nor in general, any human symbolical representation. In fact, proteins and macromolecules are late guests, recent arrivals, like so many other concepts of contemporary science, to the human festival of knowledge. Scientific concepts make sense within knowledge structures that are analogous to those of traditional myths, and they do so in the measure that the theories to which they belong may be integrated into some structure, whose economic and primitive determinations may be operational within a given historical community that lives according to the knowledge explicitly stated by those theories. The idea of scientific reductionism is a metaphysical remnant of Leibniz’s *Characteristica Universalis*, a concept which is used nowadays with connotations of priestly power struggles in academic scholastics, but it lacks any pragmatic meaning, for it does not make any sense to add stars with democratic constitutions, nor ants with symphonies. Nevertheless, meta-theory makes sense as a tool for analysis and manipulation of symbolic systems, as well as for the construction of complex frameworks of conceptualization, even though it has to be capable of making metaphorical images (not necessarily isomorphic) in the intuitive terms in which the representations of the social determinations are elaborated, in order to avoid the so much repeated hypostases.

Intuitions in relation to general biological processes are relatively common and simple, we experience them continuously in the form of health, illness, pleasure, pain, birth, death, hunger, sleepiness, etc. Obviously, these concepts, and the like, are endomorphic from the point of view of the life sciences, they are reducible to other representations, but have allowed us, during the almost two hundred thousand years life span of our species, a basic self-knowledge. From them, we have understood the bond that we share with other living beings, a knowledge from which we derived a kind of *Lebenswelt* which, for instance, makes closer the basic intuitions of evolution theory than those of quantum physics, for they correspond to a symbolization that is more distant from our everyday life experience. The epistemological problems have arisen once we have abandoned the intuitive representations of our theories and ideologies, when we have negated basic life intuitions in favor of symbolic constructions that do not correspond with experience, saying that *to die is to be born, to be born is to die, dreams are more real than reality, reality is a dream,* and other value reversals to which we have grown accustomed to through the fantasy of metaphysical myths. The basic intuitions of the *Lebenswelt* have been translated to such myths, and the difficulty that we find today with the life sciences, no less than in the 19th Century, is that of successfully disassembling mythic systems of various kinds which burden the thought with prejudice, whether supernatural -gods or divine plans that go beyond life-, or natural -like those which lead us to unconscious metaphysical affirmations such as *complexity is (or is not) the goal of evolution,*[157] hypostatizing an epistemological concept (*complexity*) beyond its valuable capabilities for determining experience.

The mythologization undertaken by modern science has onto-theologized a wide catalogue of its tools and objects of study, from the elemental particles to the human sciences and the arts, through molecules, cells, and live organisms with intelligent behavior. Such objects are part of narrative of universal law, the believe in a final objective order in the universe from which humans partake in their tiny little scale: traditional gods have disappear but not the theologization of the world. Each one of these systems of objects keeps a generative relation with respect to a simpler set, which determines its conditions of possibility, as it occurs, for instance, in the relationship that conceptual systems of anthropology have with the physiological organisms that have cortical brains, and of such organisms with respect to cells, and of these with respect to molecules, then atoms, particles, strings, etc. This chain of conditionings is implicit in the theory of evolution, although it goes beyond it. From the Kantian point of view, we would say that it is a requirement of our reason: we need chains of links between phenomena, in fact, such chains are inseparable from what we call *the world experience,* though their hypostasis beyond epistemological grounds and usefulness is unnecessary. The domains of these conceptual objects are contiguously linked, and are conditioned in similar manner. If, for instance, we call domain one to the one integrated by molecular objects and relations and two to that of cellular objects and relations, the relations R_1 of domain one between the objects O_1, condition the composition of objects and relations in domain two, however, besides a set of relations R_2, which remain conditioned by R_1, there is another set R'_2, to which we call the set of emergent relations that are not directly inferable neither from the relations nor from the objects of domain one. Thus, for instance, we cannot infer a process of meiosis from the properties of proteins.[158] Each domain D_2, possesses therefore a degree of independence with respect to the conditionings of D_1, and at the same time, is capable of conditioning it as long as it does not contradict those of R_1, as it is the case of the molecules which conform a cell, whose movement is conditioned to the cellular processes as long as these do not contradict the molecular ones. At another level, the psychological and anthropological domains, for example, maintain analogous relations: the social organization of primates depends on a neurophysiological collection of factors which do not condition the construction of a democratic and multi-party political system, even though, they do condition the existence of some form of social organization.

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[157] Issues discussed in *The Oxford Book of Rationality.* Alfred R. Mele and Piers Rawling, Editors. Oxford University Press. New York. 2004. p.434.

The understanding of emotions from an evolutionary perspective depends on the development of a neurological theoretical model and its subsequent philosophical interpretation. I will adopt the theory neural groups selection as an evolutionary model of the brain. It was initiated by Gerald Edelman and continued by Giulio Tononi,[159] and it is also called *Neural Darwinism*, a model to which I will incorporate the some theses of affective and social neuroscience, as they have been experimentally developed by Jaak Panksepp and others. Thus, I will use a mixed model that allows to go through the neural processes from their most basic formulations in simple organisms to the emotions of the great mammals and the human being. Schematically,[160] we can say that the theory of *Neural Darwinism* proposes a dynamic system formed by two sets of structures, one topo-biological whose elements are neurons, and the other biophysical, the natural vital environment, which transforms the first structure by means of processes of reinforcement or dissolution of the relations of such a structure, something that will occur in accordance to the greater or lesser activity of the topo-biological relations with respect to the biophysical. The theory proposes a detailed mechanism of the formation of neural groups in the brain which establish diverse morphisms in relation to the world, categorizing it in a double and interactive process of selection over variation. The process of selection occurs both in the embryo and the postnatal developmental phase, and in this process, the adjacent neurons connect with each other in collectives of variable sizes forming neural groups.[161] On the other hand, the process of variation is produced due to the alterations of the strength of the synaptic connections during the animal's activity, being reinforced the ones that have shown a higher adaptive behavior in relation to the environment and being weakened the ones that did not show this adaptation.[162] The theory offers a model of brain development in terms of the recursive biochemical processes that are subjected to reinforcements based on statistical frequencies. According to the model, neuroanatomy is the result of processes of neuronal grouping in which the brain systems that we know today are determined. Such systems have been evolutionarily formed in numerous sensory-motor processes of the organism, to which Edelman has called *global mappings.* A global mapping creates a dynamic and open cycle which ensures the continuous adjustment of behavior and of the homeostatic state of the organism in order to face the changing vital situation. It does not function like a computer program, obviously: the changes occur within a system that makes a selection in a continuous manner after the changing inputs.[163] It is of a probabilistic nature, for the input of the system cannot be always the same, except in situations of scientific experiment, but it does produce a reinforcement of the states that have already occurred. Global mappings, as results of the evolution of aggregates of simpler different mappings, have a triple phylogenetic, ontogenetic and epigenetic dimension, and it is at this last level where the processes of perceptual categorization are produced, structures of neural groups and relations amongst them that have produced successful homeostatic vital behaviors. Categorizations do not only occur in processes of perceptual mappings, with exomorphic relations, for they can also be the result of endomorphic mappings in which the objects are other mappings, or the very perceptual categories, i.e. a kind of mapping of second order that Edelman calls *conceptual.*[164] According to this, we could define the notion of *concept* in neurological evolutionary terms, generalizing the notions of endomorphic and exomorphic relationship that we have introduced. Thus, we can say that a concept is an endomorphic relation between neural groups of the brain that take as arguments endomorphic or exomorphic categorization processes. Analogously, perception would be an exomorphic relationship of a neural population with the biophysical environment. There can be therefore, processes of conceptual categorization that take as argument different previous perceptual categorizations, and in this sense

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[158] Meiosis is a type of cellular division that occurs during the production of gametes (masculine and feminine reproductive cells), in which two successive nuclear divisions take place from which cells will emerge that are genetically different from the cell that produced them.

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[159] The first book of Edelman in which the theory is exposed is from 1978, and was developed later in the next decade in *The Mindful Brain. Neural Darwinism, The Theory of Neuronal Group Selection.*

[160] For more details see Appendix of this book.

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[161] Cf. Edelman. *Neural Darwinism: Selection and Reentrant Signaling in Higher Brain Function.* Neuron, Vol. 10. p.115. February. Cell Press. 1993.

[162] Ibid.

[163] In fact, the neurological functional architecture does not resemble that of any machine that we may presently have. The neurological architecture is different from the computational in three fundamental aspects. First of all, the fuzzy definition of the architecture: the neural groups, as well as the anatomic connections in general, are not present simultaneously at a given moment, and the territories of the neural populations are fuzzy as well, what is more, the neural populations die or are transformed, whereas we have not built any computer architecture similar to that. Secondly, the neural connec-

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tions are not only electrical, but biochemical: cells have a self-regulatory structure determined by genes, whose order of complexity is different to the mere physical domain. Lastly, we do not have computational architectures that can handle connections to the fifteenth power.

[164] Cf. Edelman. Op. p.115.

they would have an exomorphic referent, whereas other conceptual categorizations can take other concepts as argument, in processes of increasing endomorphical abstraction.

The conceptual categorization as well as the perceptual follow evolutionary criteria for the regulation of the homeostasis of the organism: what is relevant for survival is categorized. In this scheme, memory corresponds to a re-categorization -a successful selection-, to a process, and not to a symbolic representation. We have to differentiate between the formation of memory in a neural population, and the linguistic symbolic character of explicit memory: there is no pre-codified message in the signal, neither structures capable of a precise code storage, nor a judge in nature that provides decisions on alternative patterns, or a homunculus in the brain that may read the message.[165] The distinction is relevant, for if we confuse a neurological system with a communicative system we will end up assigning emergent properties from the latter to the former, however, we can actually observe processes that we could call *proto-symbolizations* at the most basic levels of perceptive biological processes. Obviously, if by sign we understand *a substitutive representation of another,* we will not find sings at a biochemical level, but referential molecular processes. However, the recursive character of the neural mappings of conceptual categorization, implies that the perceptual mappings will be taken as arguments of the conceptual ones, and a degree of effectiveness of the conceptual category over the perceptual one analogous to that of a symbolic operation. The conceptual category has to be capable of binding a perceptual category to another that in principle does not seem related even in the absence of the stimulus that produced such categorizations,[166] in the same way that a sign establishes a relationship with that which is symbolized in the absence of the specific stimuli that bind the subject with the symbolic contents.

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[165] G. M. Edelman and G. Tononi, *Consciousness: How Matter Becomes Imagination.* Penguin Books. London. 2001. p.94.

In the model of Neural Darwinism, consciousness emerges as another process in the evolutionary configurations of the functional architecture. The conceptual categorizations, valuated after the protocols of the limbic system, that is, the conceptual memories that had evolutionary success in relation to the physiological functions performed by the limbic system, are put into contact with current reentrant mappings, with the present perceptual categorizations, by which the coherence of the present scenario (spatio-temporal locations and their objects and relations) is contrasted with that of past scenarios. To this contrast of memorized valuations of conceptual and perceptual categorizations with the perceptual categorization of the present, in multiple reentrant processes, Edelman calls it *primary consciousness.*[167] The neural systems linked to the concept of primary consciousness emerged evolutionarily as a result of their ability to integrate and coordinate a high number of sensory inputs and motor outputs that occurred simultaneously. A sufficient condition, although not necessary, for this type of consciousness is the cortical activity, although it has to be accompanied by biochemically stable memory systems of valuation, so we could say that it is a form of consciousness which has around 300 to 250 million years of age.[168] More evolved forms of consciousness are parallel to later morphological developments of the mammalian brain linked to the ability for symbolization and to language.

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[166] Cf. Edelman. *Bright Air, Brilliant Fire: On the Matter of the Mind*. Basic Books. New York. 1992. p.p.108-109.

[167] In terms of physiological architecture, the brain stem, the hypothalamus, and the autonomous nervous centers receive information about the internal state of the organism and relate it with the one that in the hippocampus, the amygdala, and the septum is received from the sensory cortex, and this synthesis is related with the valuations of previous states of the system

The model of Neural Darwinism provides a morphosyntactic description of the brain, expressed in physiological terms, from the interaction dynamics between the live organism and the environment, something which is consistent with the standardized models that neuroscience offers for the functioning of the nervous system in concurrence to morphology and development.[169] The postulation of the somatic selection, the

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which have been stored in the frontal, parietal and temporal cortex. See Edelman, *Bright Air, Brilliant Fire.* Ed. Cit. p.p.117-123.

[168] By biochemically stable memory systems of valuation, Edelman understands those which may not restrictively depend of environmental conditions, as in the case of reptile’s temperature, that would allow the categorization only under certain conditions. The temporal interval, is the one given by two different proposals: Edelman, 300 million years (*Bright Air, Brilliant Fire.* Ed. Cit. p.123.), whereas for Panksepp, who identifies primary consciousness with affective consciousness, lowers the number to the boundary of the 250 million years. (Panksepp. *Affective Neuroscience.* Ed. Cit. p.35.).

[169] See for example a university textbook highly spread like that of the Gazzaniga, Michael S., Ivrey, Richard B., Mangun George R.; *Cognitive Neuroscience. The Biology of the Mind.* Norton. New York. 2009.

valuation based on evolutionary criteria, connects topobiology and brain functionality, unifying the morphogenic physiological action with the psychological action of the organism as an evolutionary unit in relation to the environment.

Neural Darwinism was criticized by Francis Crick for its no-postulation of a mechanism for heritability in neural populations,[170] and also by Horace Barlow,[171] on the basis of the obscurity of Edelman's definitions and the proposed dynamics for neural groups. However, later experimental studies made by Wolf Singer on the one hand, and Reinhard Eckhorn on the other, have corroborated the existence of neural groups cooperatively linked which are fired at the same time and respond as units. They also have provided empirical evidence about the reentrant correlation of selected events in different maps.[172] On the other hand, the theses of Neural Darwinism have been corroborated in the recent investigations of Chrisanta Fernando, Richard Goldstein and Eörs Szathamáry, who have demonstrated the existence of evolutionary units in the brain, copy processes of neural activity that are implemented in evolutionary algorithms, operations of replication which are conditioned by Hebbian learning (the association of neurons that are simultaneously active) in which the local optimizations of previous neural states condition future replication.[173]

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[170] Francis Crick, *Neural Edelmanism,* Trends in Neuroscience. Volume 12. Issue 7. Elsevier. 1989. p.p.240-248.

[171] Horace Barlow, *Neuroscience: a new era?* Nature. Volume 331. 18th February. Nature Publishing Group. 1988. p.571. Web.

[172] Cf. Edelman. *Bright Air, Brilliant Fire.* Ed. Cit. p.p.94-96.

The model of neural Darwinism can be interpreted without assuming the ontological reality of the external biophysical structure as independent from the neural structure, and that is precisely my interpretation. Cognition is neither a mapping nor the representation of an external world in a system:[174] the very same idea of an external world, of something alien, is already a cognitive representation. Neither is a combinatory gain produced by the differentiation that a system effectuates when closing itself in relation to the environment,[175] for the idea of combinatory gain in relation to a vital system would entail the independence of the syntactic component of the system (combinatory) in relation to the processes of determination (semantic). The vital system, dissipative and irreversible, is *morphized* in repetitive cyclical actions, taking shape as memory. Such a morphization creates referential chains of processes, which depending on their position in the memory sequence will have a referential primitive character -or exomorphic-, or a referential character relative to other processes –or endomorphic.

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[173] The hypothesis of the *neural replicator,* as it is known, does not postulate that the evolutionary brain units are conscious thoughts as such, but that their dynamic follows the processes proposed in the neural model. See Fernando, Chrisantha; Goldstein, Richard; and Szathmáry, Eörs. *The Neural Replicator Hypothesis.* Neural Computation. November, 2010, Vol.22, No.11, p.p.2809-2857. Web.

[174] Cf. Niklas Luhman, *The cognitive program of constructivism and a reality that remains unknown.* In Delanty, Gerard, and Strydom, Piet. *Philosophies of Social Science: The Classic and Contemporary Readings.* Open University Press. Maidenhead. Philadelphia. 2010. P.441.

[175] As Luhman proposes in Ibid.

If we now extend Edelman's model using the evolutionist models of Panksepp's *affective neuroscience* and the so called *cognitive neuroscience of emotion* of Antonio Damasio, Richard Lane, Joseph Ledoux and others, we can construct a theory of emotions that links the physiological processes with the human symbolic processes.

As theses shared by the different neuro-affective models we could mention:

1. Human emotions show a continuum with mammalian emotions. A similar thesis to this one was maintained for the first time in philosophy by Aristotle, who from his observations of the natural world concluded that life proceeds in a gradual manner in all its activities, which led to advocate an emotional continuity, and even intellective, between humans and animals, a thesis that did not supposed any epistemological problem in his system.[176] In fact, the theses about life as intelligence, found at the end of the *Metaphysics,*[177] are based on such a continuity.
2. Emotions are the result of the functioning of neural systems of behavioral control, and were developed as an adaptive evo-

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[176] See Aristotle, *History of Animals.* 588.1-489.1.a.3. From our evolutionistic perspective is easy to see an evolutionary outline in this Book VIII, but in any case, it is interesting the contrast between the Aristotelian thesis 24 centuries earlier, with the ones that barely some decades ago (even today) blocked the development of affective neuroscience, sustaining that the study of the emotions in animals was in the best of cases (if it had anything positive at all), irrelevant for the understanding of human emotions.

[177] Book Lambda. 1072 b.14.

lutionary response of those neural systems.[178] Current neuroscience postulates that the developments of the evolved neural systems, like the limbic system, empowered organisms with a wider repertoire of behaviors as well as with the ability to anticipate dangerous encounters.[179] The emotional neural systems are related to the homeostasis of the organism,[180] to the processes of metabolic[181] self-regulation which is necessary for the maintenance of the functional parametric environments that allow the maximum energetic efficiency. It is precisely by being linked to homeostasis that the emotional systems perform an effective control over the internal and external actions of the organism, linking one with the other. The existence of such systems, and their location in the brain at a subcortical and precognitive level, has experimental evidence: the stimulation of a specific area of the brain produces an emotion and not another, and certain areas of the brain do not produce any emotions whatsoever when they are stimulated (electrical or biochemically), in the same way as a local tumor pathology can generate chronic stimulations of a specific emotion without the need of any external stimulus.[182]

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[178] Jaak Panksepp. *Affective Neuroscience.* Ed. Cit. p.25. It is also Antonio Damasio's thesis. *Emotion in the perspective of an integrated nervous system.* Brain Research Review. 26 (1998) p.p.83-86. Web. This was already anticipated as a thesis from etiological observations by Charles Darwin in *The Expression of Emotions in Man and Animals* of 1872. And later in the decade of the sixties, with the works of Konrad Lorenz, Nico Tinbergen and Karl von Frisch.

[179] Cf. J.T. Cacioppo and G.G. Bernston. *Social Neuroscience.* Psychology Press. New York and Hove. 2005. p.189.

[180] Ibid. p.165.

[181] The processes are initiated from effectors, which are regulated by internal sensory information. A failure in the maintenance of the functional parametric environments is a pathology.

3. These emotional brain systems would not only act in survival situations, but they would be responsible of the general behavior of the organisms, providing them with systems of values that would reinforce some actions over others.[183] Emotions empower mammals with a behavioral coherence which is determined from species to species according to the actions that produced the evolutionary success of each one. Thus, for example, an emotion such as fear, is not elicited by the same external stimulus in all organisms, for not all of them face the same dangers. In an experiment performed with rodents born in the laboratory, without any previous contact with predators of any kind, the exposition to cat smell completely interrupted their games (during five days and without any feline presence except the odor), whereas dog smell did not interfere at all with their ludic tendency.[184]

4. Emotional systems are hierarchically organized, and interact with the most evolved cognitive structures, as well as with the inferior levels of the organism, by means of specific physiological an motor outputs.[185] A distinction is made between implicit or unconscious emotion and explicit emotion, although the boundary is not clearly defined. The distinction is relevant for emotions as well as for other brain processes which occur in an implicit and an explicit manner, like per-

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[182] Cf. Panksepp. Op. Cit. p.26.

[183] Ibid.

[184] Ibid. p.p.18-19.

[185] Ibid. p.27.

ception, memory, motor control, or language itself.[186] We can outline parallelisms between the different components of the functional architecture of the brain and the ever more complex emotional forms, something that allows us to speak about two emotional hierarchical orders, one which follows the evolutionary order of appearance, from bottom-up, and the other which follows the inverse order. Thus, to the brain stem corresponds the basic emotional visceral activations, to the diencephalon, the tendencies towards action, to the limbic system, discrete emotion, to the para-limbic system, the combinations of emotions, and to the frontal cortex, the combinations of combinations of emotions.[187]

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[186] Cf. Lane, Nadel, and Kaszniak. *The Future of Emotion Research from the Perspective of Cognitive Neuroscience.* In *Cognitive Neuroscience of Emotion.* Lane, Richard D. and Nadel, Lynn. Editors. Oxford University Press. New York. 2002. p.408.

[187] Cf. Richard D. Lane. *Neural Correlates of Conscious Emotional Experience.* In *Cognitive Neuroscience of Emotion.* Ed. Cit. p.363.

1.3 Emotional Neural Systems

From Aristotle's earliest attempts to list emotions and passions up to the modern taxonomies, the grouping criteria have been confused and disparate, even though, rational psychology had already postulated the distinction between primary and secondary emotions, or between basic and compound, for it had been observed that many of the emotional states maintained certain similarities amongst themselves. It was *a blind* proceeding, without physiological bases, something that led in some cases, like that of Spinoza, to confound pleasure and pain with basic emotions. In the works of Paul Broca (1878), James Papez (1937) and Paul Mclean (1952), it had been proposed that human emotions were linked to specific brain parts, the topo-biological set that we have called limbic system, or visceral brain.[188] From this line of research, it was developed the so called categorical approach to emotions, which proposed the existence of a small group of emotions from which the others were derived. Such a proposal was at the same time based on the traditional philosophical approach and on Broca, Papez and Mclean's theses of brain partition, as well as on the analysis of the emotional expressions of behavior. The categorical theses assume that certain affective processes, such as fear, rage, joy or sadness, emerge from stable intrinsic brain systems that can be clarified at a biological level.[189] The approach that I will be following hereby is categorical, for the existence of different intrinsic neural systems is a corollary of the process of categorization which leads to the primary consciousness in the model of Neural Darwinism. By this, I do not mean to say that other conditionings apart from the evolutionary and epigenetic may not intervene in human emotions, although it is necessary to clarify first the psycho-biological dimension, mainly when social behavior itself, which introduces new conditionings in the basic emotions, seems to have its origin in the emotional protocols. However, I do consider that socio-constructivist approaches, which pretend to understand emotions by means of processes of mere linguistic analysis, cannot but return to the explicitation of the old mythologies in which local ethics are established.

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[188] Consisting on the limbic lobe, the dental gyrus, the amygdala, the septal nuclei, the mammilar bodies, the anterior thalamic nucleus, the olfactive bulbs, and *myelinated* axon bundles. New experimental data from 2004 (See Dalgeish, T. *The Emotional Brain.* Nature Reviews Neuroscience. Web.) include as part of the emotional system also the prefrontal cortex, the ventral striatum, the insula, the anterior cingulate and the cerebellum.

Obviously, from onto-theological standpoints, the hypothesis of a continuity between our emotions and those of all other mammals is merely rejected on metaphysical grounds, and the profound similarities and clear continuities observed at a neurochemical level –when not identical phenomena- are discarded based on ontological discontinuities produced by the action of supernatural phenomena.[190] An objection could be made, from this point of view, saying that the approach to emotions that I follow here confounds instinct with emotion, that human emotions are more complex phenomena than a mere sensation of fear. Mythological systems, and the arts based on them, are sufficient proof of the difference in complexity between animal and human emotions, however, to proclaim the autonomy of our emotions with respect to the natural world is nothing but a variation of the traditional theological theses about the origin of man. Here I accept the proposal of William James about the imperceptible overlapping that occurs between instinctive reactions and emotional expressions.[191] The distinction between instinct and emotion is usually established based on two criteria: the difference between animal and human, and the difference between mechanical or unconscious processes, and volitional or conscious processes. The first distinction, maintained nowadays by authors of social constructivism,[192] or from different religious positions, is based on the idea that humans do not have instincts, and that affections are acquired in learning processes. Such proposals are a variant of the Cartesian theories which presented animals as mere automata, while making man a divine being in his origin and his functioning. Genetic science, the theory of evolution and ethology refute a radical

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[189] Cf. Panksepp. Op. Cit. p.44.

[190] Like the declaration that Pope John Paul II made at the Pontifical Academy of Sciences on the 22nd of October of 1996, proclaiming a discontinui-

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ty between human and ape from a certain historical moment in which the divine intervention breathed human soul into an animal linage.

[191] To James, all which stimulates an instinct also stimulates an emotion. Cf. William James. *The Principles of Psychology.* Vol.II. Ed. Cit. p.442.

[192] See the theses of G. Mandler. *Mind and Body: The Psychology of Emotion and Stress.* Norton. New York. 1984.

distinction and confirm the Jamesian one. However, this attitude of rejection cannot come as a surprise. After all, what we identify as constituent of our personality are some specific emotional tendencies and a given emotional and sentimental history, so the fact that our psychological intimacy and our most profound values could have their origin in a group of physiological conditionings, and not in a plan that was outlined from eternity for my individuation, can be taken as metaphysically and morally offensive. The second distinction that separates instinct from emotion based on the consciousness of the process, is invalidated by the difficulties that the very same concept of *consciousness* has. Primary consciousness is a property of the neurological processes of categorization in mammals, and is not clear that a difference could be established at this level between *experimenting an instinct* and *knowing that one is experimenting that instinct* (which it would be, according to this proposal, the emotion). Human consciousness is not only primary, but it incorporates symbolic linguistic processes, and in this respect, emotions themselves are only neural processes concurrent with others that we would not consider as such. The definition of emotion based on the theses of Neural Darwinism is not separable from the definition of primary consciousness, but such a concept of emotion would be in many cases indistinguishable from that of instinct in accordance with the ambiguous categorizations inherited from philosophy and psychology.

The link of a small group of emotions to specific neuroanatomical parts is sustained, in fact, on rather crude experimental bases. Thus, a temporal lobotomy performed in cats, apes or people, produces sexual hyperactivity, hyper-orality and a decrease of fear, whereas a lesion in the frontal lobe makes animals more placid, or a septal lesion makes them aggressive, and these emotional states are repeated one experiment after the other.[193] Obviously, when we study the brain looking for a topo-biology of emotions, we already start with a preliminary idea of emotion, and during experimentation we find more or less diffuse concepts which we had already carried into the experiment. It is also true that the specific emotions that we have encountered, expressed in lesions or lobotomies, have always coincided with emotional processes which since Aristotle were considered basic passions, such as rage or fear.

There is no widespread agreement about basic emotions in categorical theories. Here, I will adopt the model proposed by Panksepp, organized around strictly naturalist postulates and fundamentally derived from neuroscientific studies in animals. Panksepp began with four categories of animal behavior, fear, rage, appetitive desire and sociability, with the goal of finding their topo-biology, but he found during the experimental process a total of seven topologies or emotional neural systems, with their corresponding neurochemical circuits, which expanded the starting categories. These seven topologies are brain structures whose actions are linked to behaviors that we identify with vital motivation, affective aggression, fear, sexual motivation, socio-organic behavior, maternal care, and ludic behavior.[194] These systems allow isolated stimuli, they function physiologically in an independent manner at a neurochemical level in experimental conditions, even though, by coexisting within the neurological system of an organism that interacts with its environment, they overlap and influence one another in different ways, originating the complexity of the emotional world. The study of these systems in mammals allows us to understand them in their primitive and derived (or mixed) forms, with the integrative mutual causations of limitation and potentiation. I will call *primary* to the primitive emotions of the group of the seven aforementioned systems, and *n-ary* to the mixed emotions.

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[193] Cf. Panksepp. Op. Cit. p.79.

On a preliminary basis we can define emotions -following Panksepp's criteria- as psycho-neural processes that have special influence on the control of vigor and the formation of patterns in actions that are performed amongst animals, or between animals and objects, during circumstances which are especially important for survival.[195] If we define intelligence in evolutionary terms as the ability of a living being to respond with flexibility and successfully to new vital scenarios, the emotional functioning of the brain is already a form of intelligence.[196] Neuroscience speaks about two types of neural activity which are considered as intelligence in this evolutionary sense: the cognitive and the socio-emotional. The executive functions of cognition imply the maintenance and manipulation of information which is indispensable in order to deal with situations in which the appropriate response is not dictated by the actual information of the stimulus. It is customary to include as actions of the cognitive neural systems the working memory, the attention, the representation and planning of objectives, the monitoring of responses and error detection.[197] Whereas cognitive intelligence is associated with reasoning, the emotional and the social are linked to perception and immediate processing. Cognitive intelligence is strategic and cortical, whereas the emotional is tactical and limbic, useful for immediate behavior, and better prepared for survival and adaptation, even though, when we speak of a human being these argumentations no longer make much sense, for the adaptations that have allowed his domination over the entire animal realm have originated from a development without parallel of his cognitive capabilities. A different matter is that at moments of vital stress the emotional influences of the subcortical system can be stronger than the control exerted from the most evolved parts of the brain, as we see and experience in wars and liminal situations, in which the basic emotions impose the rationality of survival. The link of emotions to the homeostasis of the organism turns them into protocols of quick response to liminal environmental stimuli, a speed which is irrelevant in strategic and cognitive decision making, which involve slower processes in which a higher quantity of information is contrasted. Nonetheless, emotions are not limited to be momentary responses, for the neural activity of the emotive systems lasts more than the precipitous circumstances, and the distinction between strategic and tactical decision loses its meaning.

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[194] Panksepp. Ibid. p.p.52-54. The emotion which I have called *socio-organic* or *social* is the one that Panksepp calls *panic*, a poorly fortunate name due to its etymology (a type of fear related to Pan, the Greek god of nature), even though it denotes the same concept in affective neuroscience.

[195] Cf. Panksepp. Ibid. p.48.

[196] The definitions of traditional psychology, which since Wundt made emphasis on intelligence as a processes of logical thinking (Wundt. *Elements de Psychologie Physiologique.* Félix Alcan. Paris. 1886. Tome Second. p.365.)

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[197] See Gazzaniga, Michael S., Ivry, Richard B., Mangun, George R. *Cognitive Neuroscience. The Biology of the Mind.* Norton. New York. 2009.

1.4 Primary Emotions

Contrary to what had been stipulated by the first behaviorism, animal organisms cannot learn just anything with the sufficient stimulating effort, for the flexibility of response is conditioned to the design of the physiological architecture. This design has an evolutionary origin, which is equivalent to say that its structure is adapted to life under certain repetitive conditions, thus, it makes sense that these reiterated processes are performed by the very same organs, and within these, by the same cellular groups. The thesis of Neural Darwinism is based on these intuitive suppositions which the physiological investigation confirms. The dynamics of the biophysical conditions, the interactions between geology and biota produce a scenario whose unstable equilibrium has forced adaptation, but only within a relatively narrow margin of possible responses, as it is shown by the devastating balance of the five massive extinctions that life on the planet has traversed. It is interesting to observe that the responses of life to each of these destructions has been very limited, in fact, it has been fundamentally the same, for life’s strategy consists on adapting its basic functions to the environment in order to be able to repeat them time and again, be this the environment of the Jurassic or that of our times. Such basic functions are, therefore, the same, and have to do with acquiring energy, with life maintenance and the ensuring of reproduction, for which different strategies will be followed that, by having been successfully repeated, will generate more complex physiological routines. Primary emotional neural systems have this simple origin, despite all the complexity of concurrence of processes that have made possible the development of life up to this point. If we expect to understand emotions, we cannot lose sight of this principle of simplicity, which is none other than the principle of organic homeostasis. Emotional neural systems can be classified in two general groups, depending on whether their functions are closer to acquiring nourishment and maintaining life or to reproduction. The first group includes the systems of self-stimulation or seeking, of aggression or rage and that of fear, and are emotions that we could call of individual range, although, rage and fear have collective repercussions. Those of the second group have a collective range, and are the sexual emotion, the maternal, the social and the ludic.

The subcortical neural system of the vital or appetitive motivation, or of the organic self-stimulation, which could also be called emotion of seeking, is the brain function that drives the organism to investigate and control the environment for the development of its metabolic activities.[198] The system is designed to respond to new situations of the organism's experience, focalizing the sensory-motor systems of the animal in tasks of approach, search and, in general, of exploratory actions related to new phenomena (especially if they are related to rewards), as well as to predictively respond in the future to cases of vital threat, based on the clues and information obtained from its activity. In this sense, it is a system of treatment and valuation for survival environments,[199] thus not limiting the actions of the animal to the immediate action, but on the contrary, depending on the species, it can include different activities of acquisition and gathering of subsistence means, expressed in purely automatic actions, whether those of ants or rodents who store nourishment for winter, or in pondered human economic savings plans.[200]

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[198] See the graphics on the emotional systems in Appendix C.

The system responds unconditionally to a loss of homeostasis as well as to environmental stimuli of diverse relevance for survival, and mediates in the learning of appetitive behaviors,[201] that is, it functions as a regulator of activity, at the same time that it provides the organism's activity with unity and coherence by participating in the formation of memories. It has been experimentally confirmed that animals become anxious, and show expectations in relation to different signs and stimuli that had been previously associated with the activation and deactivation of the system.[202] The emotion of seeking is *appeased* once the objective has been attained, but if it is not possible to satisfy the goal, animals will seek alternative consummations, which can partially alleviate the symptoms of an excessive appetitive activation.[203]

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[199] Cf. Ikemoto, Satoshi; Panksepp, Jaak. *The role of nucleus accumbens dopamine in motivated behavior: a unifying interpretation with special reference to reward-seeking.* Elsevier. Brain Research Reviews 31. 1999. p.p.6-41. p.33. Web.

[200] In fact, according to the explanation of Keynes of the price of money, a main factor for the functioning of urban communities, the price of money depends as much on the marginal effectiveness of the capital as on the psychological tendency to saving. (See John M. Keynes. *The General Theory of Employment, Interest and Money*. Harcourt Brace Company. San Diego, New York and London. 1964. p.165.)

[201] Cf. Panksepp. Op. Cit. p.p.53-54.

[202] Ibid.

If instead of understanding this system in cerebral topological terms we do it in neurochemical terms, the emotion of seeking can be characterized by a dopamine system linked to neuronal motor stimulations, a system which, as Panksepp points out, is possibly the *exaptation* or evolutionary functional reconversion of other more ancient neurochemical systems, based on epinephrine and norepinephrine, also responsible for the general stimulation of neurons.[204] It has been confirmed that dopamine plays a fundamental role in learning for the insect's brain,[205] something that allows us to submerge the roots of the emotion of seeking into the oldest stages of the animal brain. When the self-stimulation system is excessively active, it can be the cause of diverse forms of cognitive errors, in which causal mechanisms may be traced where there are merely correlations.[206] In human beings, the overactivity of the dopamine system at a mesolimbic level seems to be linked to behavioral processes diagnosed as schizophrenic.[207] It is interesting to observe the link between the cognitive errors that occur due an excess of self-stimulation and magical causation. As pointed out earlier, magical causation operated under the double principle of similarity and solidarity. The latter causally linked the objects of a scenario by the mere fact of being in that scenario, analogously to what happens with the causal conceptualization of the schizophrenic. This is particularly relevant if we take into account the presence of drugs in the environments of magical causation, for the psychosis induced by stimulating drugs is analogous to schizophrenia, up to the point that we could say that it is a drug induced schizophrenia, and that, in fact, there are hallucinogenic substances, like mescaline, which have a molecular structure very similar to that of dopamine, producing a similar type of schizophrenia.[208] On the other hand, experimental evidence has been found which relates the schizophrenic processes with the neuropsychological firings that occur in the activation processes of the seeking system and REM[209] dream states, something which would link the functioning of this system with the animistic theses of Tylor, corroborating them.

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[203] See Panksepp. Op. Cit. Chapter 6: *Seeking systems and anticipatory states of the nervous system.* p.p.144-163.

[204] Cf. Panksepp. Ibid. p.109-110. He offers an evolutionary table of the catecholamine systems of neural activation that ranges from epinephrine, responsible for metabolic activation, and norepinephrine, responsible for sensory activation, to dopamine, responsible for motor activation.

[205] See *The Role of Dopamine in Drosophila Larval Classical Olfactory Conditioning.* Mareike Schelko, Dennis Pauls, Kyung-Han An, Reinhard F. Stocker, Andreas Thum. Plos-One. July 12, 2009. Web.

[206] Cf. Panksepp. Op. Cit. p.145.

I leave for the next chapter the examination of emotions in relation to the narratives of traditional mythology, for my intention here is to give a general vision on the functionality of the emotional systems in animal behavior. However, it is interesting to highlight the connection that the emotion of seeking has with schizophrenia and the different forms of drug induced psychoses (characteristic of diverse forms of the *transcendental experience*), for it offers an fascinating perspective about the process of myth formation, and in particular, on the process of inspiration for their composition and on the concept of *liminal mimesis* already dealt with. From a neurochemical standpoint, the experience of the shaman, or that of the prophet, whether induced by drugs or by an internal imbalance in the production of neurotransmitters, is identical to the experience of a psychotic person. In fact, as James noticed, the pathological features of the religious leaders have contributed frequently to endow them with especial authority and influence over their followers.[210] An excessive stimulation of the seeking emotional system, which prompts us to activate ourselves in order to maintain the vital homeostasis, has driven us likewise –after the hallucinatory experiences of some individuals-, to establish structures of order in relation to the environment that do not have an intersubjective component, but are merely the liminal experience of a single person, or at most of a group of similar pathological persons. We encounter here a type of psychological illusion of a wider scope than the one detected by Kant in relation to pure reason.

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[207] See *Dopamine in schizophrenia: A Review and Reconceptualization.* Davis, Kenneth L.; Kahn, René S.; Ko, Grant; Davidson, Michael, The American Journal of Psychiatry. Vol.148 (11), Nov 1991. p.p.1474-1486. Web. Also Guillin, Oliver; Laurelle, Marc: *Neurobiology of Dopamine in Schizophrenia.* Cellscience Review. Vol.2. No.2. 2005. Web.

[208] See Solomon H. Snyder. *Drogas y Cerebro (Drugs and Brain).* Prensa Científica. Barcelona 1992. p.p.146-159, and 208-217.

[209] Cf. Panksepp. Op. Cit. p.163.

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[210] Cf. William James. *The Variety of Religious Experience.* Collier Books. New York. 1961. p.25. James uses as an example the personality of George Fox, founder of the Quaker religion, whose psychosis is evident in his writings.

The dialectic illusion in Kantian rational psychology occurred when we confounded an idea of reason –that of a pure intelligence- with a thinking being in general,[211] by deducing from an hypostatized property of our thinking experience, a being which fulfills such property,[212] whereas the illusion produced by an excess of stimulus of the dopamine system connects by magical causation and erroneous intuitions the elements of an scenario (or several) of experience and its objects. Our biological constitution drives us to create structures of order that do not necessarily correspond with phenomena, but even once we have detected the non-correspondence, we continue to maintain them and to ground our vital objectives and our social structures on such entelechies, negating experience as a mere illusory veil that covers a deeper relation, the one provided by magical causation under the influence of dopamine. The difference with Kantian transcendental illusion is that this *mythic illusion* would be epistemologically avoidable, and we would not need to maintain structures based on the experiences of a group of schizophrenics. However, the efficacy of animistic and supernatural hypotheses, which have served us perfectly as regulative principles of the group and explanatory principles of the world during the better part of our development as homo sapiens, make the possible cognitive errors less relevant, because from a biological point of view, life’s goal is simply to continue living. The problems have arisen when we have tried to maintain at the same time the archaic myths and the myths of science which make possible the economic relationships of modern life.

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[211] Cf. Kant, *Critique of Pure Reason.* B.426.

[212] From a property we deduce an extension for it, and then we specify it into a particular entity:
Ǝ Pure-Intelligence → Ǝx Pure-Intelligence X → A is Pure-Intelligence.

Out of the emotional neural systems that mammals share with reptiles: seeking, rage, fear and sex, it is precisely that of seeking the one which has the most general range for the animal organism, because unlike the plant, it cannot obtain what it needs for its survival without a minimum general control of spatial movement. The search in which it is translated the behavior of a self-stimulation system, is not as much a more or less rudimentary cognitive form as the neural function upon which the general animal cognition has its ground. This neural system is activated in a threefold manner: to regulate homeostasis loses, by external stimuli, or by signs that are associated with incentives.[213] The latter implies a form of learning and adaptation, whereas the others can be seen as previous stages of this last one. In the three cases, the system activates the organism so it relates to the external world according to some physiological end, it specifies a direction for action as well as a *modus operandi*. In this neural system, we can observe the evolutionary process itself, from the more mechanical actions programmed in the organism, which are activated due to an homeostatic imbalance, to those conditioned by an external stimulus, or those conditioned by experience. The itinerary goes from the automatic program to anticipation, a gradation of intelligence[214] which traverses the entire emotional system.

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[213] Cf. Panksepp. Op. Cit. p.146.

A second emotional neural system is the one that corresponds to the phenomenon of aggression by the frustration of a physiological function or an expectation. Not every animal shows aggressive behaviors, as in the case of mollusks, for example, and not every type of aggression corresponds with activations of the same neural system. The predator is not angry with its prey, nor do the competitions for reproductive advantages -which in many cases are limited to ritual displays so that ultimately the female may decide-, have the same quality of violence than the one which arises due to a frustration in nourishment or to the defense that an animal makes of its life. Panksepp distinguishes three forms of aggression: predatory, reproductive and the one that arises due to frustration.[215] The first one is linked to the neural circuits of motivation or seeking, the second to the sexual circuits, and the third, which is due to frustration, and corresponds with what we commonly call anger or rage, is linked to a neural circuit of its own, different from the other two at the level of the stimulus, although with the possibility of being linked to them depending on the complexity of the relationships of experience.[216]

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[214] The finality that operates in the dopamine-catecholamine system is the same finality developed symbolically, that operates in any cognitive process, and therefore, in scientific theories, for we can characterize a physical scientific theory by its ability to explain and predict a phenomenon. To predict is a form of anticipation: in every anticipation there is a more or less rudimentary form of intelligence.

[215] To the latter he calls it *affective aggression*. Cf. Panksepp. Op. Cit. p.188-199.

The evolutionary advantages of an affective system that incites aggression when expectations are frustrated, or when the options of an adequate development of the metabolic functions -whether for hunger or pain in general- are directly frustrated, are obvious. In fact, the existence of types of aggression linked to other emotional systems corroborates the fundamental importance of aggression in living organisms, at the same time that it poses the question about the ability of these seven emotional systems to explain *satisfactorily* human and animal behavior. Could we deal better with the emotion of rage from a system that were to include the three systems that cover the different types of aggression: that of motivation, the sexual and that of aggressive frustration? A complete treatment of rage –as it also happened with the dopamine system-, requires the inclusion of the cortical forms of emotion that the human being has developed in its evolution, as well as the interactions of all the emotional neural systems in their mutual conditioning functions. However, the advantages of a previous separate treatment of each of the systems, with their own neurochemical circuits, are evident, for we count with primitive emotional functions which give us the syntax and the semantics of human and animal affections. Thus, for instance, the correct emotional sequence is not the one that leads from hunger to rage, but that which goes from the vital motivation of searching for nourishment through the frontal and temporal cortical expectation that evaluates the possibility of obtaining it, to the subsequent frustration of such an expectation, which produces rage. If rage is an emotion that entails a non-pleasurable effect for the animal, which can be deduced from the ease with which lab animals learn to disconnect by themselves the cerebral electric stimulations that produce rage in them,[217] and if the activation of this emotion implies a loss of homeostasis with a high energetic consumption for the organism, rage must be due to a general defense mechanism not limited to a specific scenario and thus producing contradictory effects; for instance, when the frustration is the consequence of an alimentary expectation, rage behavior, by consuming more energy works against the very same homeostasis that pretends to reestablish. The neural system of aggression by frustration seems to be, foremost, a general complementary defense system of flight, and similarly produces homeostatic imbalances that allow quick responses to threats to the integrity of the organism in limit situations. On the other hand, the usefulness of the joint functioning of the system of aggression with the system of seeking for learning purposes, given the non-pleasurable[218] character of rage, seems to be a sound assumption.

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[216] Ibid.

In these considerations on the emotion of rage or anger, we are not including a whole series of processes in which it is already at work a reasoned aggression mediated by conceptual constructions of different kinds. In fact, what has been said so far, applies both to humans and animals. In the experimental cases in which an animal has been stimulated in the system of rage, its responses have always been a direct attack against any potential danger that the animal could identify.[219] Thus, in its primitive form, this emotion is the activation of an instinctive and destructive system of self-defense whose domain is not limited to a direct vital threat, but it includes any threat that may restrict the vital capacity of the organism. Analogously to the system of self-stimulation, it specifies a direction for action and a *modus operandi*, and for this reason it implies a type of non-declarative, non-verbalizable, knowledge[220] -but knowledge nonetheless- at the organism's disposal. However, unlike the system of self-stimulation, the knowledge of the organism is not grounded over this function, but instead, this second system functions as a tool which strengthens the former.

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[217] Ibid. p.194.

[218] I will use here the notion of pleasure that neuroscience employs: any stimulus that informs the brain of the potential that such a stimulus has to return the body to its homeostatic balance. See Panksepp. Ibid. p.182.

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[219] See Panksepp. Ibid. p.194.

[220] By *non-declarative cognitive procedure* I understand that which is linked to non-declarative or implicit memories. Non-declarative memories are information to which we do not have a conscious direct access. These memories can be of four kinds: procedural memories, memories of the perceptual system of representation, memories of classical conditioning, and the memories of non-associative learning. Procedural memory is the information about the motor and cognitive mappings, and it is processed in the basal ganglia and the cerebellum. The memory of the perceptual system of representation is the information which anticipates to the processes of perception (by means of previous mappings) and it is processed in the perceptual and associative cortex. The memory of classical conditioning is the information about the conditioned responses between two mappings, and it is processed in the motor cortex. Lastly, the memory of non-associative learning is the information about the processes of habituation and sensitization, and it is processed in the reflex pathways. See the model presented by Gazzaniga, Michael S., Ivry, Richard B., Mangun George R.; *Cognitive Neuroscience. The Biology of the Mind.* Ed. Cit. p.p.312-361.

For its part, fear -like the rest of basic emotions- admits a difficult definition from our cortical or reasoning language, and we have to refer to a cerebral topology and to a specific set of neurochemical substances in order to define it. Most animals, from insects to humans, experience fear and even though not all may produce a primary consciousness associated with experience, they *know* how to behave like an organism with fear (or with rage), although no one has taught them how to do so, that is to say, they will exhibit certain protocols of behavior whose result is to avoid the situation in which they find themselves. Experimentation shows that in the mammal brain exists a specific neural system in which the signals of what we call anxiety and fear are processed, which can be activated through internal or external stimuli, to which it responds unconditionally, genetically or after specific experiences, presenting a collection of symptoms related to the autonomic nervous system which includes intestinal problems, diarrhea, urinary incontinence, tachycardia, dryness of mouth or an increase in respiratory rate.[221] The responses and specific stimuli that produce fear are genetically conditioned by species, according to the different evolutionary scenarios of each of them.[222] Therefore, the system of fear is programmed to respond to pain, or to different environmental stimuli which alert of danger, but it also functions as a selector of new inputs of learning (at a subcortical level) which serve to predict threats.[223] In this sense, in the same way as rage, it functions as a cognitive enhancer of the self-stimulation system, as well as a tool for social cohesion, insofar as it facilitates the formation of dominance hierarchies by reducing confrontations between rival groups.

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[221] Cf. Panksepp. p.p.207-220.

[222] Cf. Arne Öhman, Anders Flykt and Daniel Lundqvist. *Unconscious Emotion.* In *Cognitive Neuroscience of Emotion.* Ed. Cit. p.322.

The second group of emotions, of a collective functional range, has reproduction as the main objective, even though the physiological conditions of reproduction propitiate different forms of cooperative relation which result in social organization, for which different emotional systems are developed. In mammals, the neural system that corresponds to the sexual emotion is different for males and females. Each one is the development of a former evolutionary system found in fish and reptiles, from whose neurochemical component, vasotocin, are derived –by the change of an amino acid- mammalian vasopressin and oxytocin.[224] Even though oxytocin and vasopressin brain circuits are the main substances that determine sexual emotions, these are only two neurochemical components of a longer list which is beginning to be elaborated in affective neuroscience, to which it would have to be added the luteinizing hormone (LH) and acetylcholine as well.[225] It is interesting to observe that in males the production of arginine-vasopressin is linked to testosterone production, and that there is a direct relationship between the production of the former and aggression.[226] This form of aggression is different from the one accompanying the production of *substance P* in the case of rage, and its evolutionary origin seems to obey to the competition between males for the transmission of their genes. The coordination and potentiation of the conjoined action of both systems would occur obviously only in the case in which frustration for sexual reasons may take place, which in animals seems to be limited to ritual encounters, but in humans, with the intervention of the different cognitive processes, would generate a combined and more complex type of rage, in fact something more similar to a secondary form of emotion like the one we call *jealousy*. The link between sexual emotion and violence does not only occur in the human terms postulated by Freud, of repression and civilization, but it is characteristic of the reproductive competition in mammals, a competition in which questions of social organization are also resolved: to ensure the continuity of the genes is a violent and competitive activity, as it is to ensure the continuity of the group's structure. The different types of aggression are, therefore, social tools no less than individual tools, combined and directed by social emotions, whose objective is the continuity of the group. The fundamental animal bonds are those of kinship, originated by sex, and in mammals, as a consequence of the long duration of breastfeeding, they will condition the social homeostasis to longer cycles which require a more complex collective structure.

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[223] Cf. Panksepp. Op. Cit. p.215.

[224] Ibid. p.230.

[225] Ibid.

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[226] Ibid.

On the other hand, closely linked to the sexual emotion, we find the emotion of mother care. This emotion is genetically conditioned in the brain of every female mammal, in the sense that it has its own neural circuit in which the actions of offspring care are processed, whereas the equivalent paternal care does not enjoy a neural system of its own, but it is a learned behavior. On the other hand it must be taken into account that the brain's gender is not simply masculine or feminine, for there is a gradation between these two poles according to the greater masculinization that the brain may have received in the uterus.[227] In this sense, we can speak of brains with a higher quantity of arginine-vasopressin circuits and of brains with a higher quantity of oxytocin circuits, being the latter better predisposed for the emotion of mother care. This emotion is present in reptiles but is much shorter and superficial, linked to egg laying, and in this case to vasotocin hormone.[228] Neuro-chemically it consists on the joint action of oxytocin, prolactin, and endorphins, thus being fundamentally a circuit of pleasure. It is interesting to notice that the emotion of mother care in the feminine brain occupies the same preoptic area as in males does the regulation of sex, that is, there is an emotional divergence upon a common neural place, implying the deficiency of a merely topological approach to the comprehension of the emotional circuits, and the need for a complementation with the functional understanding.

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[227] Ibid. p.p.246-247. In mammals, masculinity emerges from femininity. The initially feminine brain is masculinized in the uterus due to the secretion of testosterone and its conversion into estrogens. The feminine brain protects itself from the maternal estrogens which, otherwise, would masculinize the brain. See Panksepp. Op. Cit. p.225.

[228] Cf. Panksepp. Ibid. p.250.

There is a neural circuit in which it is regulated the fundamental emotion of the social bond between mammals. Until some decades ago, behaviorist psychologists were proposing social models in which the link between members of a group proceeded from a reinforcement in experience due to the benefits in nourishment and shelter obtained through the collective medium, even though, now we know that there is a neural system localizable in the cingulate cortex, the periaqueductal area, the dorsomedial thalamus, the ventral septal area, the preoptic area and the nucleus of the *stria terminalis,* which is responsible for the stress and pain that animals feel when they are separated from the group.[229] This socio-organic circuit is curiously situated in the same brain areas where the sexual neural circuits and the maternal emotion are also found, and is very near as well to brain areas that are directly linked to pain processing.[230] The first coincidence shows the close neural relationship that exists between the basic emotions of sex, maternal care, and sociability, responsible –due to the characteristics of mammalian reproduction- for the forms that the collective association will take. The second coincidence points towards an evolutionary origin of this system based on other more basic systems of pain.[231]

The social emotion in its negative aspect (or of separation in relation to the group) is responsible of a type of stress that is especially intense in younger animals, a stress that disappears when the animal returns to the group or when it is injected with some sort of opioid compound.[232] At a neurochemical level, the positive aspect of this emotion, the experience of social bonds, is a process mediated by endorphins and oxytocin, like it occurred in the maternal emotion, playing this last neurotransmitter an active role in the formation of collective memories.[233] The phenomenon is especially relevant in relation to myths, for in them it is placed the explicit memory of a community as identity narrative. It is curious to notice that the collective memories of a group, their identity narratives are physiologically favored both in its formation and maintenance.

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[229] Ibid. p.p.262-270.

[230] Ibid. p.p.267.

[231] Ibid.

The last one of the emotional systems that Panksepp expounds is that of the ludic emotion. The variety of actions that we identify with the concept is one of the reasons why we still lack a good understanding of its structure, for the multiple concurrent activation of abilities that play entails hinders its isolation as a system.[234] Thus, for instance, if damage is inflicted upon the caudate nuclei and the putamen of a rodent's brain, the animal will not only lose all desire to play, but also its appetite as well, its curiosity, and its general willingness to move,[235] that is, it will affect also the dopamine circuit of seeking. However, it is known that the parafascicular nuclei (which also participate in pain perception) and the posterior thalamic nuclei, promote ludic behavior in animals, whereas neither the neocortex nor the cingulate cortex intervene in play desire.[236] The desire for play and amusement are reduced by all kinds of corporal unbalances, hunger, sleepiness or illness, as well as by oxytocin, opioid antagonists, or the excess of these, in fact, opioid excess reduces the activity of all the emotional systems.[237] A symptom of the activation of the circuit of play is laughter (although this symptom can correspond to different n-ary emotions), a respiratory movement in humans, not learned and of sub-cortical origin, that communicates the ludic emotion, and which seems to be present as well in other mammals, like chimpanzees or dogs.[238] The emotion of play in mammals is especially important during infancy, where it starts being a kind of relationship with the mother to later become a relationship with other members of the group.[239] Play, in its most basic animal form, seems to be a way of socialization able to create intense bonds with the group, that are broader than the sexual or the maternal from which it seems to have been generated. The emotion of play communicates sociability, and is incompatible with fear and rage, generating at an individual level a parenthesis in the emotional emergencies of the first group (seeking, rage, fear), which by liberating stress operates directly upon homeostatic balance. Play can be linked to the emotion of seeking, of hunting in particular, and its cognitive dimension at a precortical level seems indubitable to the extent that it trains the different organic systems for survival. In humans, the cognitive dimension of play is evident, in fact, there is a clear parallelism between calculi (logic or mathematics) and games (especially those that do not consist on a great display of physical activity), with respect to its self-contained character and the explicitation of some rules, outside of which the game ends, thus entering in the domain of other neural systems. We will revisit this emotion in more detail.

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[232] Ibid. p.p.226-274.
[233] Ibid. p.p.272-273.
[234] Ibid. p.p.291.
[235] Ibid.

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[236] Ibid.

[237] Ibid. p.p.293-294.

[238] Panksepp also includes rodents. Ibid. p.p.287-288.

[239] Ibid. p.281.

In this brief exposition of the fundamental characteristics of the primary emotions, I have separated four of them, the social, the sexual, the maternal, and the ludic, with the goal of emphasizing the link that they have in relation to collective behavior. However, the other three also show a clear social functionality. In the case of humans as it is in the case of great apes, there is no single emotion without a collective content, for our entire life is always developed within a specific social environment. The seven basic emotional systems make sense psychologically when they are interpreted as an interactive neurological set that binds behavior and the homeostasis of the organism to the social and biophysical environment. It is possible that a future understanding of the neurological processes will add another neural system to these seven here exposed, or it is even possible that the circuit of play, or some other, may not be independent from the rest. We are not dealing with axiomatic systems in which the independence of the postulates may be proved by means of mechanical processes of reasoning, moreover, the emotional processes and the behavioral responses that are derived from them can cross their field of action, as in the cases of the maternal and social emotions, or the sexual and the maternal, or the social in relation to all the others. In any case, the model of the basic emotions, or any possible substitute, will have theoretical interest insofar as it may serve to organize and interpret the psychological investigation, and above all, insofar as the emotions thus organized may be sufficient to account for the emotional life of mammals and of man. For the human case, the model of basic emotions will be sufficient if it is capable of explaining how the complex or n-ary[240] emotions are produced, even though the superior limit of the model is determined by the extension that implies the introduction of symbolization and language. The most relevant issue of this combined model of Neural Darwinism and the basic emotional systems is that it establishes a paradigm for the understanding of mammal behavior which is perfectly integrated with the cognitive models for the development of human language. The link occurs when we treat the seven neural systems like a unique emotional system, which operates as a controller of the organism’s homeostasis in relation to its environment. The joint system shows more complex properties than the neural systems in isolation, for the different neurotransmitter substances that constitute them show with respect to each other diverse relations of enablement, antagonism, and neutrality. If we add the temporal differences of the effects that they have, we will have a general framework of conditions of possibility in which we can begin to understand the n-ary emotions, formed by combination of the basic ones and by the intervention of other neocortical cognitive processes. Obviously, not all of them are combinable, nor have the same durations: the emotion of play is not compatible with that of fear, and rage does not require an activation as long as the maternal emotion. For its part, the circuit of rage produces a homeostatic imbalance that cannot be maintained by an organism safely above a relative short time span. This system has a specific functionality outside of which it is not only useless, but counterproductive. How then can we explain human emotions like hatred or revenge, in which a pattern of aggression is maintained during a much longer time span than in the case of a mere rage attack? From the concurrence of the more complex brain processes of the neocortical systems, i.e. with the inclusion of reasoning processes for emotional decision making that introduce a temporal buffer, between stimuli and responses, which does not exist in primary emotions. This temporal buffer can simply obey to the differences in tempo amongst emotions: it is postponed or anticipated based on the goals imposed by emotional programs, being in many cases expanded to trans-mundane vital scenarios, as in the case of religious emotions. The names we use for the n-ary emotions are ambiguous, and similarly as what it occurs with the names of colors, we would need to add a referent (objectual in the case of colors, and an scenario in the case of emotions) in order to make the concept of the emotion precise.[241] N-ary emotions, such as hatred, can involve different neural systems in different scenarios. There can be hatred propitiated by a rivalry in the competition for resources, or hatred unleashed by a sexual rivalry. In the first case, we would be speaking of an emotion which includes rage and seeking, besides possible emotional anticipations and delays, which are already n-ary emotions, whereas in the second case, the emotion of rage merges with that of sex, besides doing it with the corresponding anticipations and delays.

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[240] I will call *n-ary,* or of *n* degree, to the emotions that are a mixture or a derivation of the basic emotions.

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[241] Like it occurs for example with the colors, blue, green, red, grey and

If emotions have evolutionarily determined the ever more complex behaviors that we call intelligence, they have had to harmonize the organism's homeostatic interests in situations that include short and long terms. The emotional systems of maternity and the socio-organic unity are clearly long term biological protocols, they give a general framework for the group to which the rest have to accommodate, insofar as the life of the group is more important than that of its individual members. The experience is always of *clusters* of simultaneous emotions and sequences of these *clusters*, processes in which emotions are limited and conditioned amongst themselves, by means of the compatibilities of their action domains and the cognitive advantages that the anticipations and the delays implicate. The reprocessing of the emotional inputs from the cortical system includes tasks of selection from the working memory, remaining outside the system the inferences of competing inputs,[242] processes in which the emotional activation is modulated from the protocols of the other emotions,

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brown. In fact, the electromagnetic waves form a continuum which our perception reduces to a high number of discrete instances.

[242] Cf. Kevin N. Ochsner, Silvia A. Bunge, James J. Gross, John D.E. Gabrieli. *Rethinking Feelings: An fMRI Study on the Cognitive Regulation of Emotion.* In *Social Neuroscience.* Ed. Cit. p.p.253-267.

as well as from cognitive deliberations. Input blockings allow the deferring of responses, in the same way as the anticipations of those responses allow their processing by means of substitutive memory representations of the input. In this manner, the valuation system of the organism can become more effective for survival, at the same time that it increases the memory capacity, which allows better inductions and a wider catalogue of responses against the vital scenarios.

CHAPTER 2

Cognition and Emotion

2.1 Comunication and Emotion

The definition of emotion that has been outlined points out towards a clear link of the emotional processes with the survival scenarios and their objects. In what way are emotions oriented towards the objects? Does it make sense to speak of emotions that do not correspond to a scenario and its objects? We have seen that the neural system of self-stimulation is activated independently of external stimuli, and the same can be said about the feminine sexual system of many species. In both cases, first appears the emotion and later it gets oriented towards objects and scenarios. The animal organism has energetic and reproductive needs to cover, and the loss of balance is continuous and periodic: emotions are also motivated by the internal scenarios of the organism. The problems arise as a consequence of the distinction that some psychologists make between affective states and emotions, the latter defined by the specific difference of being affective states oriented towards objects.[243] Such a distinction makes sense from the point of view from which we are discussing emotions, for there are affective states that are exclusively linked to biochemical causes, and they would seem not to have the need whatsoever of an object or scenario that may provide a survival content. Thus, in depression, or in chronic anxiety, the stimulation of the emotional system is not related to a specific scenario, but it remains independently active due to a problem in the functioning of the homeostatic equilibrium, and such activation is not an adequate response to the present experience of the organism, therefore, it can neither be considered like a cognitive process, whether implicit or explicit, of adaptation to the environment. This would justify the distinction between affective state and emotion, if it were not for the fact that there are processes which are neither linked to scenarios nor to physical objects, and whose cognitive-vital content is more than doubtful, as in the case of the fear of a supernatural power,[244] but which are actually considered emotional phenomena. In what sense a state of chronic anxiety would be different from the chronic fear of a supernatural power? The first one is usually considered pathology whereas the second is the adequate attitude of the religious devotee, in both an object is lacking, although they can create one very easily. The object that is constructed by the imagination of the religious devotee is the figure of a myth, that can be concretized in the social affective actions of that tale, but the devotee can discontinue the experience of his/her object of devotion without losing by it his/her religious emotion,[245] for once it has been initiated due to a specific scenario it can continue as an emotional process now without any cognitive content, either as a mere ailment or as a pathology.[246] The pathological case, for its part, will objectify its affection in an analogous manner, either taken as raw material for the ordinary actions, independently of how distorted they may be,[247] or as mere ideations derived from myths or personal experiences. Emotions can be oriented or be based on physical and psychophysical objects and scenarios (ideation processes), whether with a cognitive content corresponding to a state of affairs or merely imaginary, because what is relevant to the emotion is to initiate a protocol of response, which it will be more or less successful depending on whether the valuation may have or may have not a correspondence with the circumstances of the situation in relation to the subject. In this sense, is not so relevant to distinguish between affective state and emotion, and it is simpler to call *emotional pathology* to those activations of the emotional neural systems that require a deliberate[248] external biochemical action in order to return to a condition of equilibrium within the general homeostasis of the organism.

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[243] This is the thesis of Gerald L. Clore and Andrew Ortony, in *Cognition in Emotion: Always, Sometimes, or Never?*. In *Cognitive Neuroscience of Emotion*. Ed. Cit. p.p.24-56.

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[244] And other more complex religious emotions, like faith or love for the divinity.

[245] For example, he can stop seeing the figure of his devotion, like so many instances of saints in the *dark night,* without losing by it his religious emotion.

[246] Think also about the fear provoked by the inquisitorial institution of the Catholic Church, not only for the devotees, whose torturers were cable of making real the objects of their self-satisfied ignorance by means of torture which produced the emotion of fear, without cognitive content, and without us being able to think of that fear as a pathology.

[247] See the commentaries that William James makes in relation to this in the chapter *The Sick Soul,* in *Varieties of Religious Experience.* Ed. Cit. Especially in p.140.

We can define basic emotions as those processes of primary consciousness of a biological organism that have been evolutionarily protocolized, both at the level of stimulation as well as that of the response to such stimuli, based on internal and external survival scenarios constituted by perceptual and/or conceptual categorizations, which are relevant for individual and collective survival actions. The assignation of these processes to an ego is common among different neuroscientific authors, the term used is SELF (Simple Ego-Type Life Form), and it is considered that this SELF emerges during the early development of motor processes that are coherently organized in the mid-brain, although it is also represented in relation to more complex functions of the most evolved brain,[249] that is to say, even though its origin may be in the global mappings, it is operational in more complex structures. According to Daniel Siegel, the SELF is created by associations of unconscious processes, which, when being synthesized, allow a better strategic manipulation, although there are processes of perception, memory, or even of abstract cognition, that proceed to a great extent without consciousness involvement.[250] The thesis of cognition processes which are developed in unconscious manner is widely accepted by contemporary neuroscience. It should not come as a surprise, for cognition has been biased by the postulates of rational psychology as mere rational (even syllogistic) cognition, while the whole phenomenon of the living organism is a continuous display of cognitive-adaptive processes.

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[248] Or physical, but capable of producing the necessary biochemical effects to make the neural system return to the condition of equilibrium.

However, if we accept the ego (SELF) hypothesis as a memory association of unconscious processes in cases of primary consciousness from which survival strategies are coordinated, we are affirming that consciousness is composed of unconscious elements, which is equivalent to say that there is an entity that is conscious of the unconscious, thus a paradoxical affirmation. According to this we could think that the ego is something like a unit-entity in the apperception of the protocolary functioning of the organism, but the restrictive character that some emotions have upon others, entails that some systems will be blocked in favor of others, thus, the supposition of such a unit-entity does not have a neurological ground, beyond the unity of the plurality of elements of the system that we postulate in subsequent cognitive analyses.

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[249] Cf. PAnksepp. *Affective Neuroscience.* Ed. Cit. p.309. A concept of ego, such as the SELF or another analogous inevitably appears when talking about the most complex consciousness processes.

[250] Cf. Daniel J. Siegel. *La Mente en Desarrollo.* Trans. Jasone Aldekoa. Editorial Desclée de Brower. Bilbao. 2010. p. 371. (English Edition: Siegel, Daniel J., *The Developing Mind.* The Guilford Press. New York. 2012.)

In fact, the responses of each emotion separately are perfectly protocolized without the intervention of an ego, as shown in animals which do not possess processes of primary consciousness. An alternative would be to think that the emotional responses on the whole condition the organism to a unity of action, and that the primary ego is but a discrete register of these actions, something like an indexation process of response scenarios, already representational, in which the repetition of the action generates a subject in relation to a set of objects. This primary ego would be fuzzy in times when there is no emotional action, and focalized in times of action. As we have seen, with the exception of the system of self-stimulation, all the other emotional systems have a collective function (rage and fear not only collective), therefore it makes sense to say that the emotional systems are longer active in collective actions than in individual ones, and that for this reason, the focalization of the ego is developed and strengthened in collective emotional communication. It is in this context of the communicative unity of action in which the egoic function has vital advantages, for it allows the formation of more complex organic structures after simpler individual ones which unite with each other by means of the communication of emotions, integrating strategies from different fields of the vital experience.

The ego seems to have its origin in the integrated action of the emotional responses, developing itself progressively afterwards in the communicative processes of such responses. Amongst animals, communications are sequences of basic emotions, which regulate behavior in a reaffirming manner stabilizing the individual organism within a group, and generating at the same time an individual and a collective identity.[251] Emotions provided the basic lexicon for the construction of behavioral protocols that are communicated within a collective with homeostatic ends, at the same time that regulated the individual homeostatic equilibrium around the indexing memory of the ego, as a reaffirmation of the successful survival memories. In terms of the group, the emotional protocols give the common memory heritage, determining something like a collective ego that is actuated in emotional relations and is indexed in terms of individual experiences. Contrary to what happened with the categorizations of the neural systems, which were syntactic biochemical processes, this communication is semantico-pragmatic, regardless of the use of phonetic or gestural signs. In the case of animals, whose phonetic communicative abilities are quite limited, the gestures, the body postures, and in general, the actions, complement communication.[252] In animal ritual protocols, movements and body features are elaborated and exaggerated with the goal of activating emotional neural structures in the participants of the ritual, systems that will be affected by the sequences and repetitions of the specific signals that constitute it, producing neuro-endocrine changes that will affect the homeostasis of the participant organisms.[253] Gestures, as George H. Mead postulated, can be understood as primitive stages of the communicative act that will evolve until becoming an interaction mediated by symbols in which the egoic consciousness emerges.[254]

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[251] It is interesting in the case of Martina, the she-goose of K. Lorenz, who by not being able to complete in one occasion a ritual acquired at home, related with going to a specific place at sunset, entered into a panic state. See David Eliam et al. *Rituals, Stereotypy and Compulsive Behaviour in Humans and Animals.* Department of Zoology. Tel-Aviv University. p.22. Web.

Animal social communication, insofar as it is limited to a basic emotional repertoire, is only a proto-communication. Some classical communication theories, like that of Mead, postulated the specific difference of human communication with respect to animal communication in a type of egoic activity which was called *generalized consciousness of the other (generalized other)*, that which is produced when we observe our actions from the point of view of a supposed general social persona. Within a context of multiple communicative interactions, as the one occurring in ordinary social experience, to take the standpoint of the other involves to put oneself in the place of many others, or what is the same thing, to have a clear image of the group's identity. To that end, it is necessary to be already in communication with the group, there has to be a minimum consciousness of the *generalized other,* but this is only attainable, according to Mead's postulates, through the communicative action, something that would seem paradoxical, for in order to be able to communicate we should already have knowledge of the group's identity. It involves our known paradox about the origin of language, which occurs because neither Mead nor social behaviorism have a theory that explains the formation of the basic lexicon which makes communication possible, of that which allows an interlocutor to interiorize the information he receives and be able to make an interpretation with respect to the same frame of reference. The theory of basic emotions covers this vacuum, and avoids the paradox, for the communicative action was already initiated before the appearance of humans, and our symbolic language, more sophisticated than that of animals, was based on the interpretative conditions of possibility given by the emotional protocols. The action of *taking the attitude of the other* is possible due to the emotional uniformity within and without the species, which leads, without solution of continuity, from gesture to symbol, and with such a process, to the appearance of an ego which is communicator and interlocutor at the same time. The idea of

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[252] However, the symbolic content of animal language is far superior to what had been thought some decades ago. Dogs can recognize more than sixty words (some significantly more), mangoose are capable of transmitting information about predators, monkeys are capable of counting, etc. Even the bonobo has been able to understand linguistic commands from a hidden speaker, orders such as: *take the tomato that is in the microwave.* See Ehrlich, Paul R. *Naturalezas Humanas: genes, culturas y la perspectiva humana.* Fondo de Cultura Económica. Mexico. 2005. p.282.

[253] See the examples about this communication in different animal species offered by Candace Alcorta and Richard Sosis from the Connecticut University, in *Signals and Rituals of Human and Animals.* p.5. Department of Anthropology. University of Connecticut. Web.

[254] See George H. Mead, *La genesis del Self y el control social. Reis.* No.55. 1991. p.p.165-186. Web.

taking the attitude of the other must be understood metaphorically, like a semantic equivalence of *having the same emotional constitution as the other.* The communicator and interlocutor ego is but the particularization of the communicative node, whose complexity will be proportional to that of the emotional protocols that are being communicated, from which the ego itself has emerged. Although is true -as it has been thoroughly documented in numerous neurological, anthropological and linguistic theories- that the functional architecture of human communication, contributed to make communication more complex. Thus, the morphological changes that followed bipedalism produced cranial changes that allowed a descent of the larynx and the appearance of a supralaryngeal space by which we can produce a sonorous articulation with more vowels and in general with an increased capacity for more complex and varied sounds. However, the development of a more sophisticated language does not depend exclusively of this higher phonetic ability, in fact, we can imagine languages that are phonetically poor with which we can express complex ideas, even though a better ability to produce and categorize phonetic objects favored by a wealth in means, added to a highly active social life like that of hominids, contributed positively to the linguistic praxis, which in turn propitiated a more specialized neural development. The complexity of our communications is equivalent to that of our social life, moreover, both things are the same phenomenon, a product of a symbolic development whose ground is semantic: the valuation protocols of the emotional system which allow to reduce the multiplicity of experience to those actions that are relevant for homeostasis, processes of semantic simplification which allow a higher syntactic effectiveness.

In the same way that we speak of homeostatic equilibria for individual organisms, we can do so for social organisms,[255] after all, it involves a concept whose extension is given by states of equilibrium in biological systems, and a human community can be thought of from this point of view. Socio-cultural homeostasis can be defined as the set of processes that human social organisms perform in order to maintain an environment of equilibrium in their survival activities. These processes are not necessarily the most efficient energetically speaking, as our current historical development shows, even though they are always adaptations to the imposed conditions of the environment and available technology. The relationship between cultural and biological homeostasis is much closer than it would seem at first glance: in fact, the socio-cultural advancements can lead to changes in the genome, as it has occurred in the case of the adaptation to lactose.[256] In neural terms, the socio-cultural homeostasis begins at a subcortical level, for our communities are grounded on basic emotional regulative principles, though these are processed and elaborated neocortically, with the intervention of categorizations and representations of n-ary consciousness which correspond to the complete activity of human language, in which the emotional cognitive abilities are widened and strengthened by the use of reason, allowing the development of strategies of anticipation and delay of vital scenarios as well as the elaboration of more complex degrees of symbolization. The basic emotions together with the n-ary processes of group consciousness provide the semantic content expressed in myths and rites, actions that shape the homeostatic regulation and agglutinate the identity of the social organism. Myths can be thought of as the evolution of the human sphere of the protocolary and ritualistic communication of mammals, and as such, arise from the spontaneous communicative development of our language in their social functions of emotional homeostatic regulation. In the same way that the individual ego, as neural process, evolves from its states of primary and intermittent consciousness, taking form in emotional protocolary processes and becoming the n-ary interlocutor that emerges in the actions of social communication, thus evolve the contents of human communication, in a range that spans from the emotional protocols linked to survival to the supernatural and natural myths of higher symbolical constructions. Such contents are the self-narrative of identity, a supra-personal identity based on the phenomenon of the emotional language modified by the symbolic language.

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[255] Antonio Damasio does so in *Y el cerebro creó al hombre (Self comes to mind).* Ed. Cit. p.p.434 and s.q.

[256] Ibid. p.439.

2.2 Logic and Psychology

The survival of the human group precedes in evolutionary terms any other symbolic action, which will always have to assume such a survival as a fundamental final referent. If the content of the organism's categorizations are the successful processes of adaptation, the valuation referents would be such processes, and the meaning of all other actions would be derived after these. For this reason, basic emotions provide the fundamental semantics of our language, and are cognitive processes that evolutionarily precede what philosophy has called rationality. Both the system of seeking and that of fear perform cognitive functions of induction, after pattern recognition, based on the memory of experiences, which are selectively strengthened by fear.[257] Fear functions as a social regulator when it is coupled with rage, as can be observed in the hierarchical formations of animal communities as well as in the repression that the law in human communities entails. On the other hand, rage communicates states of frustration in which individual instabilities that affect the group are expressed, some homeostatic loses that are regulated by means of the violent repression of unwanted behaviors. Likewise, the impulse for seeking, from which an individual organism benefits, also occurs at a collective level, and prospers according to its degree of symbolization, in fact reaching its maximum power when it is accomplished by the group, due to the concurrence of greater energies and to the multiplying effect of the ordering structures which allow specialization. For its part, sex establishes basic human relationships of association that structure the group, besides offering epistemological analogies for the general processes of generation, a strategy which has served (even today it serves at the core of some of the great religions) for a simple ordering of the universe. The emotion of maternity embraces the entire initial process of social learning, and serves epistemologically, like sex, to elaborate primitive cognitive schemas in which the universe is understood through a maternal or paternal link with it. The social emotion is mainly communicative, and therefore cognitive; in fact, it is this emotion the one which (modified by the others) makes relevant the semantic content that is being transmitted, i.e. the group is the final referent of meaning. For its part, the ludic emotion has at the same time a cognitive and a social dimension, strengthening the bonds of the group. Play, by enclosing the vital experience and self-containing its actions, allows the creation of simulacra in which the actions of direct relevance for survival can be anticipated and rehearsed. To sum up, all the emotions have a cognitive function, and by having evolved from the relationships between the live organism and the environment allow a flexible and adaptive behavior that we have called intelligent.

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[257] Cf. Panksepp. *Affective Neuroscience.* Ed. Cit. p.48.

According to the model of Neural Darwinism, the global mappings generated perceptual categorizations -or of first order- and conceptual categorizations -or of second order- in which the frequency of certain actions which successfully related the organism with the environment produced permanent circuits or memorizations (understood as re-categorizations), that conditioned the future behavior of the organism. Such categorizations imply a first type of valuation which follow an inertial impulse for the preservation of life, to which we can hardly call intentional or conscious, but which, nonetheless, generates a frame of reference for basically syntactic processes that can be considered like a proto-semantic system. These circuits –analogous in all mammals- to the extent that they systematize pairs of internal and external stimuli with motor responses, index representational scenarios from the categorical valuations, a process of valuation of second order which takes as objects the global categorizations linked to their scenarios, in which it is configured a rudimentary, diffused, consciousness, that is linked to the emotional protocols, and it is active insofar as these are active as well. There is primary consciousness as long as there is emotion, and such a consciousness is nothing more than its protocol of action. This second order valuation is the basic emotional valuation that serves as semantic referent for the actions of survival, and it is more complex depending on the type of perceptual and conceptual categorizations that may enter in the determinations of the emotional neural circuits. To the extent that the different neural systems, with their different tempos, interact amongst each other, processes of anticipation and delay will be produced, to which we could call of *deferred valuation*, in which the protocols of respond become more flexible, whether anticipating or delaying them in order to complete a successful action of survival that is better adapted to the scenario in question. The emotions of longer duration will condition those of shorter duration, in the sense that they must adjust to the general program of action for the organism. If the emotional core is composed by the emotion of seeking and the reproductive emotion, and the first one has an intermittent functioning, then it must be the mammalian maternal emotion the one that agglutinates around itself the rest of the emotional system. In fact, the physiological maternal bond in mammals can be extended for decades, because fetal cells cross the placental barrier and the blood-brain barrier,[258] something which seems to indicate that the maternal emotional conditioning occurs at an even more basic level than that of the neural systems, a fact that would support the idea that it is this emotion the one that centralizes the mammalian social behavior. The emotional system on the whole supposes a valuation of third order whose objects are the valuations of the primary emotions, and unlike the two previous valuations, the endomorphic component of the action of response is greater, in the sense of being, relatively, less conditioned by the environment, of requiring a less urgent validation and molding the scenario according to the internal conditions. These three valuations, to which we could call *vital liminal valuations,* or valuations of the *Unterlebenswelt,* make up the basic semantics for the actions of the organism. On them are grounded the neocortical symbolic developments of the human being, whose valuations have to be in harmony with these vital liminal valuations, as a kind of lower bound which conditions them. Nihilist symbolic valuations of life have subverted the most basic values of survival proclaiming the unreality of human existence in favor of the unconditioned reality of a supernatural world, though -despite negating the existence on this earth- they have transferred the world of the emotional valuations to that ideal world, they have projected basic emotional contents into those other worlds. Of course, it could not be otherwise, for if it were not so, if the gods were not fathers and mothers, and the positive and negative experiences on the other worlds were not to have an emotional content, it would make no sense for the biological organism of the mammal.

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[258] See Bianchi, D. W. et al. *Male fetal progenitor cells persist in maternal blood for as long as 27 years postpartum.* In *Proceedings of the National Academy of Science.* U.S.A. 1996. January 23; 93(2): p.p.705-708. Web. And also Rei Sunami et al., *Migration of michrochimeric fetal cells into maternal circulation before placenta formation.* Landesbioscience.com. October, November, December. 2010. Web.

Vital valuations are evolutionarily previous to the higher symbolic ones and have priority over them in their own scenarios. The neocortical control over the subcortical systems is effective only in non-stressful situations.[259] Emotions involve a processing of maximum efficiency of the memories of the species in extreme situations. In these cases, the amygdala is in charge of producing a higher quantity of dopamine and norepinephrine, interrupting the functioning of the prefrontal cortex, in which it is located the so called working memory or *blackboard* memory -indispensable for abstract thinking-, thus being activated the emotional protocols.[260] The emotional neural systems are superposed with the systems that are in charge of somatic activation, as well as with others in which are processed the personal judgments that are adopted in decision making. These latter systems are different from the systems that correspond to a more specific cognitive intelligence,[261] however, the constrictions exerted by the emotional systems over learning during the long evolutionary periods of behavioral adaptation, have made the emotional experience, in humans, inseparable from cognitive ones, even so in merely logical processes.[262] Neuro-scientific studies about deductive reasoning have shown that a process that may seem isolated from emotions, like in the case of deduction, is conditioned by them in neurological terms: inference is emotionally modulated.[263] Emotions can affect deduction in two possible ways: due to the presence of semantic content in logical reasoning, which activates the linguistic neural systems and long term memory –which in turn activates the emotional systems-, or directly due to the emotional content of the scene in which the reasoning occurs, that is, the emotions of the reasoning subjects.[264] As the experimentation undertaken by Vinod Goel has shown, the purely symbolic reasoning, like the syllogisms in which the premises are represented by letters, involves an activation of the visual parietal system, which is not activated in syllogisms in which there is a semantic content. When our propositions have a semantic content, beyond their interpretation as formal symbols of a calculus, such semanticity *resonates* emotionally in the subject, activating memories and emotions that neuro-chemically condition the functionality of the blackboard memory, introducing external factors into the merely formal game. The easiness by which argumentative fallacies are produced –formal and informal- is grounded on this phenomenon of emotional conditioning. The influence of the emotional elements in the argumentation has been known since ancient times,[265] and it is normally used, inadvertently or deliberately, in social communication, even though, it was superstitiously considered that the most formalized deductive reasoning was immune to emotional influence.

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[259] Cf. Panksepp. *Affective Neuroscience.* Ed. Cit. p.301.

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[260] Cf. Amy Arnsten, Carolyn M. Mazure and Rajita Sinha. *El cerebro sometido a tensión.* Investigación y Ciencia. Junio 2012. Prensa Científica. Barcelona. p.p.64-67.

[261] Cf. Reuven Bar-On, et al., *Exploring the Neurological Substrate of Emotional and Social Intelligence.* In *Social Neuroscience.* Ed. Cit. p.p.223-235.

[262] Cf. Gerald M. Edelman. *Second Nature: Brain Science and Human Knowledge.* Yale University Press. New Haven and London. 2006. p.65.

[263] See: Vinod Goel. *Cognitive Neuroscience of Reasoning.* Draft Nov. 27. 2003. Web. In the book, *Cambridge Handbook of Thinking and Reasoning.* Eds. K. Holyoak and R. Morrison. Cambridge University Press. 2003.

On the other hand, as Roland Friedrich has shown using fMRI, formal and natural reasoning are processed differently at a neural level, for they correspond to different evolutionary areas despite their structural analogies.[266] There are different neural processes for different reasoning actions: the deductions of mathematical logic and those of everyday life -which are imbricated in the mythological inheritances of the natural languages- are applied to their corresponding scenarios, and it is not clear yet if there would be some of these scenarios in which these neocortical activities could be harmonized with one another. The differences between natural and formal reasoning are much greater than it would be expected at first glance, and if we judge the patterns of everyday life from the reasoning structures of science, we find ourselves with a surprising abyss between them, whose explanation has the evolutionary content that Friedrich pointed out in relation to syntax. We could speak of at least two kinds of symbolic reasoning with their corresponding types of valuation, although both conditioned, ultimately, by the emotional processes. Both operate with an added mutual tension due to the inevitable interaction that they maintain as a result of the demands of the vital processes of the modern human being, who lives following the patterns of formal reasoning -in which his most n-ary techniques are based-, as well as those of natural reasoning which, being nearer to the basic emotions, serves as a link with the praxis of such a technique in everyday life.

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[264] Cf. Goel. Ibid. p.29.

[265] See the treatment of the enthymemes in Aristotle. *Rhetoric.* 1354a. 15.

[266] Cf. Roland Friedrich and Angela D. Friedrich. *Mathematical Logic in the Human Brain: Syntax.* p.p. 1-5. May 28, 2009. Plos ONE. Web.

The tension between these two reasoning ways is basic in order to understand modern man psychology and the processes of emotional valuation. Let us take as a comparative tool for natural and formal reasoning a common structure to both, the material conditional. Bertrand Russell and the logicians characterized pure mathematics as a class of all the propositions of the type *p implies q,*[267] which, aside from the validity of the declaration, gives us an idea of the importance of the structure of the material conditional within a field so unequivocally rational in its proceedings (not always in its ontology). The structure of the conditional occurs in all human natural languages,[268] and in the last fifty years it has been as exhaustively studied by psychology as it had been by philosophy -and in a very problematic manner- since Aristotle.[269] It is not my intention to treat this discussion in detail, but simply to show what are the bases that make the material conditional such a problematic question, in order to illustrate the difference between natural and formal reasoning, and the place that both occupy in relation to the processes of emotional valuation and later in myth construction.

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[267] Cf. Bertrand Russell. *Principles of Mathematics.* W.W. Norton & Company. New York. 1964. p.3.

As William and Martha Kneale pointed out, some classical authors tried to formulate the conditional as a necessary connection between statements, and these were defined as constructions in which it is not possible that simultaneously the consequent may be false (apodosis) and the antecedent true (protasis), even though the contradictions appeared everywhere. For the Megarians Philo the Dialectician, and his master Diodorus Cronus, *well-formed* conditionals cannot begin with the truth of the antecedent and finish with the falsity of the consequent, being their construction correct in the rest of cases of truth valuation of protasis and apodosis. Philo argues in relation to the material conditional some questions which even though they were left aside by the logic of the 20th Century, appear in natural reasoning. I refer to the problematic of the temporality in relation to antecedent and consequent, as in the case in which a conditional may be true during a moment of the day and not so during another: *If it is daytime then I am reading this sentence.* According to Philo's framework, it would be logically true both during the day and at night, because the falsity of the antecedent does not make false the construction of the material conditional, but it is intuitively contradictory. The problematic is not only due to the possible divergences between a syntactic conditional structure and the self-referential semantic content of a proposition, from which are derived well known paradoxes, but we find ourselves with more general semantic problems in relation to the conditional when the temporal dimension is introduced, a tension that occurs between logic's ambition of timelessness, inheritor of the Parmenidean thought that studies the immutable essences that relate among each other in syntactic games, and the directional mutability of experience. With an example: Let there be P and Q two past events that are not made true simultaneously. P became factually true (in the sense that the semantic content of the sentence P corresponded with a set of physical actions) first, and later Q. Let us now construct the material conditional $Q \rightarrow P$. Such a conditional is well formed, for it never happened the case *True→False*, and when afterwards it occurred *True→True*, it continued to be in accordance with the definition of truth of the conditional. We are postulating a connection between something that has not been yet, and something that has already been.[270] Let us suppose now that *P* and *Q* are two future events that are not true simultaneously, and that *P* will become factually false first, and later *Q*. Let us now construct *P*→*Q*. The conditional is well formed, for it would never occur *True*→*False,* and when *False*→*True,* or *False*→*False* may occur, it will be equally well formed, although we are postulating some relations whose epistemological content is irrelevant (at best) and paradoxical, because we are affirming a link which is non-existent from the present point of view and that it occurs for all conditions of truth and falsity of the antecedent and the consequent. In the case that *P* may become factually true first and then *Q*, in order for the conditional to be always true, we must formulate it as *Q*→*P*. On the other hand, any pair of propositions that became true simultaneously in the past, or will become true simultaneously in the future, will form -in any order- well-formed conditionals.

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[268] Cf. Comrie, B. *Conditionals: A Typology.* Cited in Mike Oaksford and Nick Cater (eds.). *Cognition and Conditionals. Probability and Logic in Human Thinking. Introduction.* Oxford University Press. Oxford. 2010. p.3.

[269] In Sextus Empiricus, are found formulated the four main conceptions that are developed in classical logic about the conditional. *Pyrrhoneiae Hypotyposes.* ii.110-112. See the discussion of William and Martha Kneale in *The Development of Logic.* Oxford University Press. Oxford. 1984. p.p.128-138.

The use of the material conditional as a necessary connection between antecedent and consequent has not been the most common, neither in the sphere of logic nor in ordinary thinking. In the logic after Russell, the role of the material implication is better understood when it is considered in a wider context, like the one provided by the axiomatic system of number theory. $(x)\ A(x) \rightarrow B(x)$[271] expresses the relationship between variable propositions, or propositional functions, that we call formal implication. The formal conditional represents implication, not in an a priori sense, but in the sense defined by the formal system.[272] On the other hand, in ordinary language, the primary goal of a conditional statement is not to maintain the notion of a necessary connection between protasis and apodosis, but to call the attention about a possibility whose fulfilment is somewhat uncertain to the speaker, and whose consequent has only meaning in relation to the antecedent.[273] This phenomenon has been studied by the psychological *Mental Model Theory*,[274] which, from the syllogistic schema that takes the conditional as major premise and as minor the affirmation or negation of the antecedent or the consequent, has characterized ideal reasoning by means of a three-step process. The first one involves the representation of the reasoning process through a set of mental models compatible with the major and minor premises. In the second, a conclusion is obtained which is innovative and true for all the models of application of the syllogism. Lastly, counterexamples are sought for, additional models that may be compatible with the premises but not with the conclusion.[275]

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[270] Moreover, the acceptance of the consequent in the past carries the question of the validity of the reasoning to purely semantic terms, to the factual truth or falsity of the statements *P* and *Q*, which no longer belongs to formal logic.

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[271] Read as: “For all x, if A is x then x is B.”

[272] Kleene, Stephen Cole. *Introduction to Mathematics.* North Holland Publishing Co. Amsterdam P. Noordhoff N.V. Groningen. 1964. p.p.138.139.

[273] Kneale. Op. Cit. p.135.

[274] Started by Phillip Johnson-Laird with *Mental Models: Towards a Cognitive Science of Language, Inference and Consciousness.* Cambridge University Press. Cambridge. 1983.

However, in practice, the reasoning accomplished is a different one. Experimental psychology has shown that the difficulties that formal logic has had with the conditional since its very beginnings are rooted in our spontaneous way of thinking the sequences of phenomena and the propositions that verbalize them. Thus, for instance, in a syllogism in which the major premise is the conditional and the minor Q, or $\neg P$, which formal logic would solve in uncertainties, are solved in the scenarios of natural reasoning with the *acceptance of the consequent* and the *negation of the antecedent.*[276]

Table 1: Syllogisms of natural reasoning.

Major premise: $P \rightarrow Q$

Name of the inferential process	**Minor premise**	**Conclusion**
Modus Ponens	P	Q

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[275] Sonjia M. Geiger and Klaus Oberauer. *Towards a reconciliation of mental model theory and probabilistic theories of conditionals.* In *Cognition and Conditionals.* Ed. Cit. p.p.295-296.

[276] This is especially noticeable in children and people without an education in logic or mathematics. See Nilufa Ali et al. *Causal discounting and conditional reasoning in children.* In *Cognition and Conditionals.* Ed. Cit. p.p.117-134. And also David E. Over, Jonathan St. B. T. Evans, and Shira Elqayam. *Conditionals and non-constructuve reasoning.* In Ibid. p.p.135-151. As well as Henry Markovits, *Semantic memory retrieval, mental models, and the development of conditional inferences in children.* In Ibid. p.p.178-195.

Modus Tollens	$\neg Q$	$\neg P$
Fallacy of Accepting the Consequent	Q	P
Fallacy of Negating the Antecedent	$\neg P$	$\neg Q$

In natural reasoning we find two limitations with respect to formal reasoning: the two spontaneous deviations noted (the acceptance of the consequent and the negation of the antecedent) and the openness of the system of natural reasoning. Both matters are related, for the deviations are partly produced due to the confusions generated by the semantic content in relation to the sequential content of the material conditional. If we accept the thesis that emotions establish a proto-semantic root for symbolic communications, and that the processes undertaken in a protocolary manner by the basic emotional systems constitute a unity of meaning for the organism, the natural forms of inference make sense as chains of actions (or propositions) not analyzable into individual actions or propositions. If an stimulus (internal or external) activates an emotional protocol E formed by a sequence $P \Longrightarrow Q$ (read as, *Q follows necessarily from P),* the synthetic unity of meaning is the pair *(P, Q),* that is, the protocol *E,* which distinguishes two temporal irreversible moments, in which it cannot be the case that action *P* may occur without occurring also action *Q.* If I find myself in a dangerous situation, my organism activates the physiological changes that we call the emotion of fear, and if the protocol is to have the effectiveness that evolutionarily has shown, has to activate the entire sequence, so that by finding ourselves in any of the elements of that chain of actions we can ensure that it has been preceded by some specific actions and will be succeeded by others, as the antecedents of the cascade progressively unfold. It is a question, then, of a reasoning schema in which the two fallacies of accepting the consequent and negating the antecedent make sense. The difficulty that natural reasoning has with the acceptance of the *Modus Tollens* happens because in the elements of the sequence $P \Longrightarrow Q$, the minor premise, $\neg Q$, does not negate P but the synthesis of signification that forms the sequence E, which, when it occurs, has emotional meaning, of survival, whereas when E does not occur, we find ourselves in a natural process that corresponds to another type of characterization, speculative and neocortical in this case, which we could call an scenario of formal reasoning. Suppose that we construct the following material conditional: *If a raging dog would attack you and you were near a tree that you could climb to, it would be reasonable to climb to that tree.* Let us suppose, to simplify, that we assign to the propositional conjunction of the antecedent a single formula P, and that we will only consider the cases in which simultaneously occurs the attack and the fortunate presence of the tree, or none of these two occurrences. Within a scenario of natural reasoning, we would be dealing with a sequence E formed by $P \Longrightarrow Q$, in which is posed a dangerous scenario with a possible way out: the action of climbing the tree. Suppose now that P occurs as minor hypothesis. To conclude that Q will occur is unproblematic, a *Modus Ponens,* although if the person doing the reasoning is someone who goes usually armed, can change the scenario and offer an alternative *R: forget the tree and kill the animal.* If on the contrary, we affirm the consequent *Q,* to climb the tree, the synthetic unity of *E* makes us infer *P* (fallaciously), and in the same way, if we negate *P*, we will be also negating *Q* fallaciously. Natural reasoning is occupied with elaborating scenarios with minor premises that function as a sequence pair *E(P,Q),* with a unified meaning, a unification which if it is not achieved by some of the values of the antecedent or the consequent, it will be attained by substituting the consequent for *R*, that is *E'(P,R),* but without touching the antecedent, for it is the condition that defined the reasoning scenario in the first place, and without which it makes no sense to continue thinking. Within an emotional scenario the need for sequence is even stronger, and although the response to fear is conditioned to the experiences of the individual in similar stressful (liminal) situations, the initiated sequence will be completed, and in such a context neither the minor premises like $\neg P$, $\neg Q$, make sense, nor to try to deduce the truth or falsity of *P* once *Q* has been produced, these are considerations that find their place perfectly in reasoning processes in which the blackboard memory intervenes. The scenarios of natural reasoning are found half way between those of emotional liminal reasoning and those of formal liminoid reasoning. In fact, we could consider natural reasoning as a delimitation of the processes of basic emotions in non-urgent situations, in which n-ary emotions process sequences in a sequential manner *E(P,Q/R),* which only become $P \Rightarrow Q$ in formalized liminoid scenarios, in which the dominant emotion is that of knowledge (an n-ary emotion).

On the other hand, the models of natural reasoning, as different from formal models, are open, that is, additional information can enter the system altering the former logical structure (called non-monotonic systems). Thus, for instance, in relation to the myth of Oedipus, since we know that Oedipus was a man and all men are mortal, we conclude that Oedipus died, however, knowing that later he disappeared at the entrance of Athens, because the gods *took him away*, we are not so sure anymore if we could conclude his mortality. Another similar case would be that of a friend who tells us that he has a mammal as pet, to which he has named Fred. By having such information we simply infer that Fred is not poisonous, but later on we find out that Fred is a platypus, one of the rare venomous mammals, and so we change our conclusion. The opening of natural reasoning does not only occur from the side of the reasoning scenario, in which not all the information is determined a priori as part of a calculus and new data can continually enter, but also from the opening of the reasoning subject, who will interpret the scenarios following specific mythic (ideological) structures, which condition both the formulation of hypotheses that may be plausible with the scenarios and the rejections of those logical assumptions that may suppose a basic contradiction with the axiological core of its mythology. The interpretations of natural reasoning usually lead to assign a truth-functional value to the propositions, according to the scenarios and times in which these occur, or lead directly to accept the paradox as a condition of some specific epistemological scenarios, especially those that refer to exomorphic representations. However, the most complex types of natural reasoning do not operate by a simple acceptance of the paradox, but by means of *non-monotonic* adjustments. If we observe natural reasoning, the non-monotonicity expresses itself according to this schema: $(P \land \neg T) \rightarrow (Q \lor R)$, in which T represents the adverse conditions that will impede the occurrence of Q regardless of the occurrence of P, and R represents the additional information that enters the system. While T destroys the scenario logically, since in the *Modus Ponens* $\neg(P \land \neg T)$ blocks the deductive certainty, R safeguards the whole scenario, for its acceptance as truth makes true the scenario described by the formula, an R which can be either a corroborated fact by social experience or a hallucinatory personal belief.[277] With an example: *If Fred is a mammal, and not a virtual mammal, then Fred is not poisonous, or Fred is a platypus.* The proposition: *Fred is a platypus,* is late information that by being thus added saves the first scenario. Another example in which beliefs intervene: *If the gods have created the universe, then the universe is proof of our perfection in all its actions.* Here the first belief, P (*the gods have created the universe*) is expressed as a necessary condition for the whole argument, and it is not contemplated either $\neg P$, or a possible T that may contradict it. The point is to prove the consequent by means of the *Modus Ponens,* and when a negation of the consequent is produced by means of a *Modus Tollens,* like in a proposition that contradicts the beliefs by affirming: *hunger, war and emotional*

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[277] A distinction which is not always so simple to make when we deal with religious constructions.

misery, in which the better part of humanity lives and which are actions of the universe, do not show any perfection or grandeur, therefore, the gods, if there were any, either are not perfect or have not created the universe, the most common answer is to produce a disjunctive premise to be added to the consequent that saves the argument: *human suffering is part of a divine plan whose perfection escapes the ordinary human*, as, for example, do the Hinduism and the three religions of the *Book*. In sum, the ability of human reasoning does not operate equally in liminal scenarios than in the liminoid scenarios of experience. Formalized thought is a late evolutionary development that is limited by the most basic inferential operations that take place in the emotional processes. When propositions have semantic contents, they are processed in different neural areas than when they do not, and with the semantic content a whole valuation system of the subject enters the scenario. For its part, the greater liminal weight of the scenarios of natural reasoning determines absolutely the reasoning action, and the syllogisms work spontaneously with the fallacies of *accepting the consequent* and *negating the antecedent,* moreover, such fallacies obey a need from the part of the emotional protocols that is perfectly intelligible. In most reasoning scenarios of human vital experience, rationality is inseparable from emotionality.

It has not only been proven the emotional conditioning of natural and formal reasoning, but the alleged independence of moral judgments with respect to the emotions (and in fact, the independence of these judgments with respect to any human thing)[278] -which the philosophy of ontotheological grounds was inclined to think from Plato down to our times-, has been refuted as well by the neuro-scientific investigations. Moral decision-making is not independent from emotions[279] –despite the fact that both processes have a different topobiology-,[280] that is, our morality is biologically conditioned, something that we could simply derive from the understanding of the functionality of the emotional protocols, but which has been also confirmed by means of neurophysiological experimentation. Emotions condition even our perception of reality, for it has been observed that perception data are not even processed in a simple manner, but are re-elaborated from the combination of the emotional systems, from criteria such as that of group cohesion (belonging and not belonging to a particular group), something that can distort even the sizes of the objects perceived.[281] Some authors sustain that there is not a specific neural system for moral judgments, but that these are produced by means of a complex interaction between multiple neural systems which are not specific to this cognitive activity,[282] a postulate that seems to confirm the thesis of the emotional control of morality by proposing a *decentralization* of the natural processes that correspond to moral judgments into other neural systems. The resolution of these differences can only be empirical, even though (regardless of there being or not an exclusive system for morality) by being an activity that involves the emotional social neural systems, it makes no sense to consider it independently of them. However, there is a generalized agreement about the importance of the modulation that emotions exercise on moral judgments, and in fact, the frontier between the emotional and the social neuroscience is becoming increasingly vague. For this reason, human emotions can be considered the most complex neural processes, to the extent that they are mixed with all the other brain processes,[283] obviously, always considering that we speak of n-ary emotions, with scenarios of natural reasoning of the kind $(P \wedge \neg T) \rightarrow (Q \vee R)$, dealt with earlier, and not of mere processes of basic emotions.

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[278] Analogous to the independence of mathematical objects with respect to the ordered space-time experience to which we call world. In moral judgments, we also deal with ideal objects whose necessity is formal (like that of the mathematical objects) from which its universality is derived.

[279] See Joshua D. Greene. *The Cognitive Neuroscience of Moral Judgment.* In *The Cognitive Neuroscience IV.* Department of Psychology. Harvard University. Web.

[280] A neural net which comprises the orbitofrontal cortex, the temporal pole and the superior temporal sulcus of the left hemisphere, is specifically activated with moral judgments, whereas evocative emotional judgments, but not moral, activate the left amygdala, the lingual gyrus, and the lateral orbital gyrus. (Cf. Jorge Moll et al., *Functional Networks in Emotional Moral and Nonmoral Social Judgments.* In *Social Neuroscience.* Op. Cit. p.63.)

[281] See, J.T. Cacioppo and Gary G. Bernston. *Social Neuroscience.* Ed. Cit. p.p.97-98.

N-ary emotions can perfectly handle logically contradictory scenarios, introducing disjunctive hypotheses that express beliefs, although they are not capable of processing scenarios that are non-linkable to the basic emotional circuits in which the survival of the organism is based. What is relevant to the emotion is not the form of a given scenario, but the importance of such a scenario for the subject, its link to any of the specific emotions that guide the actions of survival. Let us suppose for a moment that in the future humans develop a new neural system to process new scenarios of survival. Let us call *aesthetics* to this new emotion, an emotion that we define as an exaptation of some part of the system of rage, within an imaginary society so civilized and reasonable that rage is already a marginal and sporadic emotion. Suppose that the aesthetic emotion solves situations in which rage functioned before, in such a manner that whoever has that emotion more developed will enjoy a higher social recognition and higher reproductive opportunities, both in relation to children and to ideas. If we are capable of imagining such emotion, is because we associate it with the other emotional systems. If we understand this hypothetical scenario, is because we connect it to scenarios of our current emotional experience. An intelligent living being who may not share with us anything more than the system of seeking, who is asexual, non-social, and who does not feel fear or rage, would be fundamentally incomprehensible in its actions, and it would only be comprehensible from the actions related to the seeking neural system. Unconsciously, when we speak of intelligence we talk about life, and when we talk about life we imply the process of development of all or at least some of the characteristics of the emotional systems. We consider as intelligence the adaptive ability of living beings, of which our most formalized and methodic reasoning is but an n-ary evolutionary development of the set of the emotive-communicative system, which functions more like a limiting regulative condition of cognitive processes in certain liminoid scenarios, than as a pragmatic condition of human action. The use of reason is conditioned to the emotional homeostatic contexts of the group's survival, and for this reason its intervention in the narratives of identity is always restricted by the needs of the homeostasis.

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[282] See, J.D. Greene, *The Cognitive Neuroscience of Moral Judgment.* Ed. Cit. p.26.

[283] Cf. Gerald M. Edelman. *Bright Air, Brilliant Fire.* Ed. Cit. p.176.

2.3 Continuous Rationality

Presently we count with two main groups of contrary hypotheses about the origin of human language in relation to animal communicative forms: the one represented by Chomsky and the linguists of generative grammar, which sustains the discontinuity of the origin of human language in relation to animal proto-languages, and the hypothesis of the continuists, sustained by Bickerton, Pinker and others, who from diverse anthropological, linguistic and neuroscientific points of view, although all of them with a common evolutionary motivation, proposes the gradual development of human language. The theory of emotions as the basic semantics of human language that I have presented here is, clearly, continuist, both in relation to the origin of language as well as with respect to the general cognitive processes of the living beings. From this vantage point, human language is the most evolved result of an animal progressive process of communication which culminates in human symbolization but which shares its fundamental elements with the rest of life: our way of symbolizing is consistent with the rest of our vital actions. However, we could maintain evolutionist and discontinuist theses at the same time, as in the case of Chomsky, by simply emphasizing the insurmountable distance that our human grammar supposes with respect to the language of other species. The discussion seems to be, thus, fundamentally syntactic, and in particular, it seems to be reduced to the adoption or rejection of an axiom about the existence of an innate universal grammar in the human being therefore I would like to justify my rejection to such an axiom as part of my exposition of the thesis of continuous rationality.

The Chomskyan thesis maintains that our language presents a property which is isolated from the rest of living beings, to which he calls *discrete infinitude*, the language's ability to construct with several dozen signs an infinite variety of expressions, which is especially manifested in the intellectual ability for handling natural numbers, as well as in the innate ability that children show to understand that sentences are composed of a number *n* of words, but not of n + 1/2, and that sentences can be indefinitely extended in a recursive manner.[284] These abilities, purportedly exclusive of human beings, are common to all linguistic production and constitute an essential property of language which provides the speaker with the creative ability to express an infinite number of thoughts, as well as to adequately react to an unlimited number of situations.[285] According to Chomsky, who in this matter follows the Enlightenment tradition, the particular grammars of languages must be supplemented with a general or universal grammar that may accommodate the creative aspects of language and express the profound regularities which, by being universal, are omitted in the particular grammar.[286] However, the study of particular grammars shows that the universalization in relation to languages takes place more in relation to the categorizations which are made of experience (the grammatical categories) than in the sequential order relations of such categories. Thus, for instance, out of the possible combinations of order for the triple structures formed by verb, subject and object, while a 45% of languages use the structure SOV, and a 42% that of SVO, the structure OSV is practically non-existent.[287] The use of five out of the six possible combinations, the combinatory variety, would suffice as a counterexample for the thesis of a universal grammar, something that seems to support the proposal of a semantico-pragmatic centrality of linguistic communication. Would not an innate universal grammar precisely imply that the order of grammatical categories should be the same? In the syntax of formal languages, the question of the order of signs is in fact fundamental to determine the well-formed expressions, but in natural languages the order seems to be subordinated to the intelligibility of the linguistic utterance, and this intelligibility happens with any of such combinations; moreover, someone can speak and communicate in several of them without much problem. What is common is the categorization into verbs (actions), subjects and objects, but there is no reason to think such categorization as exclusively human, as it is shown by the fact of the interactions that living beings have in accordance with the spatio-temporal scales that they share. The order that we call *human grammar* could perfectly be just an evolutionary specialization of the general sequential perceptual order, the need to use sequential structures in which the perceptual and conceptual categorizations may maximize the capabilities of the blackboard memory. The fundamental categorizations of grammatical actions and objects will be related to the different survival scenarios, a selective[288] neural categorization from which the emotional protocols would be derived, and from them, at a human level, the valuations that are expressed in the communicative actions. This would be compatible with the innate existence in the brain of a specific area for the processing and decoding of speech, like the one confirmed by neuroscientific experimentation,[289] even though, not necessarily for this reason the functional structure of this area in a particular grammar would cease to be a learned issue. Moreover, as Philip Lieberman has argued, there could be specific inherited areas in the brain for the processing and comprehension of speech and yet, the processes of human grammaticalization would not necessarily need to be innate, for tasks as complex as grammar involve many different brain areas, and complex multifocal circuits of distributed neural nets are constituted in the brain linking the activities of multiple different neuro-anatomic structures, in a cerebral behavior which is at the same time localized in a specific area and distributed along many areas as well, and these connections can only be produced through the vital experience.[290] Our grammar, then, like other actions in which many neocortical systems are involved, and despite the fact that our brain has areas in which language is processed, is a result of a synthesis of neural systems that have developed once the human being has been exposed to complex vital scenarios. This would explain not only the differences of order in the basic grammatical categories of natural languages, but the emergence of the grammars of formal languages from the demands of experience, as it occurred with the appearance of geometry after the problematic posed for the control and measure of the territory, or that of arithmetic after the commercial relations, or that of logic after the Athenian public citizen argumentation, or the calculus of the 17th Century after the problems of optics, astronomy, navigation and artillery.

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[284] Cf. Noam Chomsky. *Nuestro Conocimiento del Lenguaje Humano: Perspectivas Actuales.* Universidad de Concepción y Bravo y Allende Editores. Santiago de Chile. 1998. p.p.13-15.

[285] Cf. Noam Chomsky. *Aspects of the Theory of Syntax.* The M.I.T. Press. Cambridge (Mass.) 1982. p.6.

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[286] Cf. Chomsky. Ibid. p.6. The thesis is from the Enlightenment, as Chomsky shows in his references to texts by James Beattie –who already speaks about universal or philosophical grammar- or Du Marsais. Cited in *Aspects of the Theory of Syntax.* Ed. Cit. p.5.

[287] Out of the six possible structures, five are used. According to Russell S. Tomlin, besides the percentages indicated for SOV and SVO, there is a 9% of languages that use the structure VSO, a 3% that use the OVS and 0% that use the OSV, although there are some examples of OSV in the Amazon basin, like the Jammadi, the Warao and the Xavante. See *Appendix A* from the *Basic Word Order: Functional Principles.* Croom Helm. London, Sydney, Wolfeboro, New Hampshire. 1986. p.155 and s.q.

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[288] In the terms exposed of Neural Darwinism.

[289] The areas activated by the mother language are not confined to the auditory primary cortexes. See Dehaene-Lambertz, Ghislaine; Dehaene, Stanislas; Hertz-Pannier Lucie. *Functional Neuroimaging of Speech Perception in Infants.* Science. 6 December. 2002. Volume 298. Web. See also Dehaene-Lambertz, Ghislaine et al., *Neural Correlates of Switching from Auditory to Speech Perception.* Neuroimage. 24(2005). p.p.21-33. Web.

Regarding the ability of language to produce arbitrarily long structures, it is obvious that, in the sense in which we are dealing with language here, as a structure, is a human property, even though the underlying argument for this postulate is tautological and circular, for it comes to say that we are different and unique because we are humans, that is, because we are us, we are unique and different. The theory has a few problems. Let us examine for a moment the logico-mathematical formulation of the thesis of the discrete infinitude as presented by Andrew Carnie.[291] The argument is as follows:

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[290] Cf. Philip Lieberman. *Human Language and Our Reptilian Brain.* Perspectives in Biology and Medicine. Volume 44, number 1. (Winter 2001). P.p.32-51. The John Hopkins University Press. 2001. p.34. Web.

Premise 1: There is at least one well-formed sentence that has more than zero words in it.

$$\exists x\, (F(x) \wedge \mu(x) > 0)$$

Premise 2: There is an operation in the PSRs (Phrase Structure Rules) such that any sentence may be embedded in another with more words in it, which is equivalent to say that there is an operation of linguistic recursivity.

$$\forall n\, (\exists x\, (F(x) \wedge \mu(x) = n)) \rightarrow (\exists y\, (F(y) \wedge \mu(y) > n))$$

Conclusion: Therefore for every positive integer *n,* there are well-formed sentences with a length longer than *n.* In other words: according to the generative argument, the set of well-formed sentences in English (Spanish, or any other natural language) is, at least, countably infinite.

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[291] Andrew Carnie. *Syntax: A Generative Introduction.* Blackwell Publishing. Malden (Mass.), Oxford (U.K.) and Victoria (Australia). 2007. p.p.32-33.

$$\therefore \forall n\, (\exists y\, (F(y) \wedge \mu(y) > n))$$

The argument is a Modus Ponens in which we move from a $\mu(x) > 0$ to $\mu(x) = n$, where n is a positive integer number, by which we are affirming that the cardinality of F, the set of the well-formed sentences, is at least the cardinality of the natural numbers, $\aleph_0$. The well-formed sentences are the ones that a native speaker recognizes as such, and these will be the ones that do not present non-allowed orders in the sequential disposition of the words, or absurd meanings: there will be ill-formed sentences due to syntactic issues and others badly constructed in relation to their semantics.[292] This set is problematic in several aspects with respect to its definition.

In the first place, we can remove a finite number, or even an infinite one, of sentences of the set W of well-formed sentences in English and we would still have another infinite number of well-formed sentences:

$$W = \{a_0, a_1, a_2, a_3 \ldots\}$$
$$S = \{a_1, a_3, a_5 \ldots a_m\}$$
$$W\text{-}S = \{a_0, a_2, a_4 \ldots\}$$

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[292] Cf. Ibid. p.p.13-14.

Let us suppose that *S* is the set of all well-formed sentences in English which are used in speech. This number is very high, but finite, which results in that if I take by chance an $a_i \in W$, the probability of a_i belonging to S, i.e. to the well-formed expressions which are actually used in speech, will be zero. On the other hand, what is the meaning of talking about a set such as *W*-*S* which contains an infinite number of well-formed expressions according to a pre-established set of properties (universal grammar) which are not used in speech? What is the explanatory benefit of the concept of well-formed formula with respect to a natural language? The effectiveness of the set *W* that defines a universal grammar is, in fact, null. The grammar works with *S*, and not with $S \subset W$, in fact, $\exists a_j \in S$ which is undecidable with respect to *W*, that is, there is a well-formed expression of *S* about which we cannot decide if it belongs to *W*. In fact, by definition, there cannot be any ill-formed formula within *W*, still, let us suppose a sentence $m_i \in M$, which is the set of the ill-formed sentences (such as they would be recognized in isolation by the native speaker), which is within a well-formed sentence a_i like for example: *the sentence that says* m_i *is ill-formed*. Although a_i is well-formed, there is a fragment of it that is not, m_i, which is a complete sequence of signs arbitrarily long and defective which cannot be in *W*, but insofar as it is within a_i, it is well-formed, and it would belong to *W*. Moreover, *the sentence that says* m_i*...,* is a_i itself, to which we are declaring as well-formed and ill-formed at the same time. We find that we can construct well-formed sentences with ill-formed fragments, that is, that there are sentences that present incorrect sequences and that belong to *W*, and furthermore, that they would be intelligible for the native speaker as part of a communicative scenario. The meaning of the sentence does not need to be self-referential, for the context suffices to transform an ill-formed sentence which occurs within a well-formed one into an intelligible expression from the part of the speaker: *the foreigner said* m_i. In fact, if we observe the sentences of literary works that belong to a culture's heritage, recognized by a native speaker as well-formed sentences merely for being part of that heritage, we will find examples that, if we take them out of context, will be recognized by the same speaker as semantically ill-formed sentences in Carnie's sense. Let us take a stanza of Lorca as an example:

All time blaze in flints slept
With anise the beetles drunk
Forgetting the hamlets' moss.[293]

We could find many more examples of semantically ill-formed sentences in the poetry of the 20th and 21st Centuries, from which we can infer, unless we leave poetry outside the realm of grammar and the order of the city (in a Platonic fashion), that ill-formed sentences, like this one of Lorca, are also part of the grammar, given an adequate context. The validity of the concept of *well-formed sentence* of a natural language seems, then, to be restricted to contexts of formalization, therefore it would not have a pragmatic sense to speak of a *universal grammar* which depends on a definition of such a concept, but of a grammatical relativity with respect to a pragmatic context. The problematic of the rules of formation that provide the properties of *W* is not limited to natural languages, as meta-theory after Gödel has studied. In order to make explicit the rules that determine if an expression is a well-formed formula of a calculus, such rules cannot be formulated from the calculus itself, nor from a different formal calculus. In the second case, because we would enter into an infinite regress. In the first case, because the rules of formation precede those of transformation (and provide the symbolic practical conditions of possibility for these) and we could not employ the principles of the calculus to organize and describe that without which it does not even make sense to speak about principles. With these limitations any theory is forced to proceed in its constructions using an informal language in order to formalize the system of propositions that constitutes it. It has been normally described in terms of imprecise concepts, like that of *intuition*, and thus we speak about procedures of *intuitive inference*[294] for the meta-theoretical constructions in which to define objects and relations of our formal calculi. My thesis is that such intuitive inferences are actuations of emotional protocols with which we have conformed our *Lebenswelt*, with respect to which the formal languages are an *Überlebenswelt*. According to this, in relation to *W*, the determinations will be made based on the

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[293] Federico García Lorca. *Poeta en Nueva York. Obras Completas I. (Poesía Completa)* Edición de Galaxia Gutenberg y Círculo de Lectores. Barcelona. 1996. p.518.

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[294] See Kleene, *Introduction to Metamathematics.* Ed. Cit. p.p.59-65.

Lebenswelt, which in turn is conditioned by the determinations that the basic emotional system imposes, which constitutes a pre-valuative *Unterlebenswelt* that plunges its roots beyond our species:[295] *W* depends on the emotional semanticity, and any grammar as well, and makes sense to think of it as *S,* and not like a process of infinite iteration.

On the other hand, also from the vantage point of communicative praxis, the concept of an infinite well-formed sentence does not make any sense: what does it mean a process of validation (to test if a formula is well constructed) which is infinite? By the time we were finished validating there would not be language nor humans anymore. It is not valid the appellation to the testing that a machine could undertake, for as we have said, *W* cannot be specified by applying formalizing rules (ergo, is not machinable), but from an inferential intuition such as that of the *Lebenswelt,* for this reason the checking would have to be undertaken by a human being, and be ratified by others, in a process in which intervene both the conventions and the basic formulae of the world's intuition, the emotions, but never principles of universality in the Chomskyan sense. A sentence is well-formed with respect to a pragmatic referent, namely, according to its ability to transmit a semantic content in a particular environment. The generality of environments and rules is due to the common emotional referent that makes communication possible, and not to a specific syntactic extra-emotional structure. Additionally,

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[295295] See what I have said about this topic in Óscar E. Muñoz, *Mythopoetics. The Symbolic Construction of Human Identity. Volume I: Mythic Domain.* 2.2. Trans. Nur Ferrante. Mandala Ediciones. Madrid. 2013.

according to what neuroscientific experimentation seems to show, recursive structures and induction in general seem to be basic processes of the system of self-stimulation. Interspecies communication in the animal world is ubiquitous, and it is possible insofar as they share an emotional referent. Obviously, animals do not understand our art, nor our intellectual constructions, but we understand each other perfectly at the intersections of our basic emotions. The theories of the discontinuity do not have any consistency outside the onto-theologies in which they are proposed, either natural beings, or ideal structures that do not correspond to our experience. Chomskyan theory, although it postulates the genetic conditioning of language in our brain, does not accept that such conditioning may have been attained progressively in a very long evolutionary process of the hominids, instead, language was reached in a sudden mutation which has produced a neural organ (an structure) that is not found in other animals, which implies that such an organ has functioned basically in an analogous manner since its beginnings up to now, according to a universal programming that is expressed in the different languages of the planet, something that the research of Roland Friedrich also appears to refute.

Chomsky's theses are a contemporary variation of old theories about reason. Logos, or speech, was proposed as the specific difference of humans with respect to the animal genre, no just as our ability for deduction according to an apodictic discourse, but mainly as our general faculty to think verbally, to establish symbolic communications. Greek philosophy, and scholasticism later, defined man by its rationality, a concept which seems to be always linked to the ability to speak and symbolize, but which appears to connote likewise a universal mode of divine order.[296] Descartes understood the difficulty in defining human being as a rational animal, a delimitation which simply diverted the problem towards the concepts of *animality* and *rationality*, equally problematic, and conducive towards other concepts not exempt from difficulties.[297] However, the fundamental problem is the impredicativity produced when we include ourselves in conceptual systems which at the same time contain other living beings as elements. When we define an object *O* from a property *P* which is only definable after *O*, we are giving an impredicative or circular definition, form which paradoxes are derived, and which does not tell us anything that we have not placed there already. This is the case of the *human* object and the *rational* property. Man is the rational animal, and rational is the faculty to handle a symbolic human language. We create the conceptual class of *animal*, and at the same time we include ourselves as element of the class, and provide our specific difference from the specific difference itself. When the categorizations of class have only human referents, like in the arts, politics, etc., there is no impredicativity, but laws of internal composition, endomorphisms, but when we choose the *animal* category and we differentiate ourselves by the rationality, we are creating a whole system and pretend that it has an objective and non-paradoxical sense outside ourselves. If we say: *the human is the animal that does not characterize himself as irrational,* it does not hold as specific difference, because the rest of animals do not categorize themselves as irrational either (they do not make any categorization at all). If on the contrary we say: *the human is the animal that does characterize himself as irrational*, here we are giving a specific difference, for none other animal is capable of such a categorization, but the result is paradoxical, because that which would make us different from other animals would be to characterize ourselves as irrational. In fact the difference is given by the ability to categorize, both according to the property of rationality and that of irrationality, that is, the distinction is prior to the property in question.

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[296] Plato in *Menexenus* declares that man is superior to the rest of animals because of his logos and also because he is the only one which possesses justice and religion. For his part, Aristotle distinguishes the double irrational and rational principle of the human soul, being the latter his difference with respect to animals, subject only to passions (*Nicomachean Ethics.* 1102.a.27; *Eudemian Ethics.* 1220.b and s.q.)

[297] Cf. René Descartes. *Meditations on First Philosophy. Second Meditation.* In *The Nature of Mind.* P.22.

The solution proposed above about the basic semantics of emotions, which understands our language as a change of degree in the communicative symbolic ability initiated by our animal ancestors (not only hominids, or mammals), and which continues developing progressively even today, is a non-impredicative alternative to define rationality. In this case, the notion of *rationality* is replaceable for that of *neural activity of communicative symbolization that is differed and mediated by objects.* By *differed* I understand any communication in which the coding and decoding of objects belong to different spatio-temporal environments, without adding to the term the metaphysical load that deconstruction has placed on it. The *difference* that I refer to would not be limited to human symbolization, but the concept would cover a more general field. Thus, for instance, the categorizations that insects make of different chemical substances which indicate them if another insect belongs or not to the community, and which are associated to a specific behavior in relation to such an individual, a violent response for example, as in the case of ants, belong to the genetic programming, but are a type of *differed decoding*, in which the information was codified in a spatio-temporal scenario different from that of the decoding. Whether the information is codified by means of DNA sequences, or by means of the synthesis of proteins in the nucleus (which are the long-term memories), does not entail but variations of molecular processes, directly interrelated, through which the live organism processes the information according to its different levels of complexity. The general definition offered does not have other intention than to be a minimum conceptual basis common to the different types of progressive rationality which will be seen promptly.

The most surprising thing about languages is not the recursive ability that grammar shows, an ability that we find ubiquitously in the processes of reentry and categorization of the living organisms with a nervous system, nor the aesthetic sensations of sublimity that produce in us the aesthetico-mathematical speculations with an infinite number of possibilities, but quite the opposite, that in such an ocean we may be able to understand each other, or that a child of less than two years of age may be able to make himself/herself understood speaking as badly as he/she does. The surprise is none other than the fact of understanding that we communicate because we have emotions, and that we communicate more complex things not because of a general recursivity, but due precisely to the limitation of the recursivity by way of primitive recursive functions which give us the exomorphisms or limits for the world. The limitless is noise, anomy and entropy, the liminal, and to live is to reduce it to protocols, simplifying, semanticizing it in specific contexts. Semantization is the assignation of a primitive recursive function to an ordinary recursive function, the establishment of certain exomorphic representations in which the endomorphic chains are stopped. Within formal languages, the primitive recursive functions are the functions that exhaust their computation, which have a terminus that detains the process of calculus, and in terms of the human language, are the functions by which a linguistic formula, whether well-formed or not, makes sense within a given context of experience and not in another. By this I do not mean to say that any sentence refers back to an exomorphism. The majority of the communicative sequences are endomorphic, but for these to make sense within a given context, there should be possible to trace a literal referent (almost always emotional in the scenarios of natural reasoning) from them.

The hypotheses about the origin of human language that have the greatest acceptance today, such as the gestural, that of grammaticalization, the neural, and that of the interaction mother-child, among others, are all continuists and address the issue in an evolutionary manner. Especially relevant in relation to the theory of emotions that I have expounded are the theories that center on the communicative social aspect of our language, grounded on the social emotions, and especially on the one with the longest duration, the maternal. In a complex system, like that of human culture, any attempt to reduce its dynamics to a single cause, cannot but produce partial results in the best of cases, and severe paradoxes and nonsense in all the rest. The processes of recursivity, ubiquitous in the biological action, point, as a better strategy, towards a non-linear and open[298] understanding of the phenomenon of language and of rationality. We can imagine evolutionary scenarios in which conjointly operate the factors of a size and specific brain complexity in conjunction with a basic semanticity given by the emotions, in which the praxis produces a progressive grammaticalization, from the concrete to the abstract, a process of increasing selection of objects and relations relevant to the ever more ample scenarios of symbolization. One of the possibilities for language development and rationality -now in the Homo sapiens- is the modular theory that Steven Mithen proposes, according to which, human language is first developed within the social sphere with a greater complexity than in other spheres of life, and that later, from this core, it extends towards the rest of environments.[299] Modular theory is consistent with the theory of emotions that I maintain here, and in an evolutionary plane it would imply that the development of the different neural systems has supposed different types of intelligence, each of them recursively defined, in relation to what had come previously, but with the added quality of a modification through adaptive reentry of the elements that existed in the previous state. The unification of these processes is feasible insofar as there may be a referent in the homeostasis of the collective organism which expresses itself in relation to the environment in emotional protocols.

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[298] Human language is comprehensible as an open and non-monotonic system, in which information enters (semantico-pragmatic) capable of changing the former structures of information of the system. By *non-linear* I mean that the actions and their effects do not necessarily maintain a constant proportion. Linguistic actions do not have linearity with respect to the merely physical ones.

It seems that the development of a language like ours has been a long process of small steps that began in the animal world. It spanned from the first attempts at communicating the presence of predators, the mutual attractions and rejections, the social actions and hierarchies inside the group, and in general, all the relevant information for survival (so effectively encoded in the emotional protocols), to the first human protolanguages, crossing over the slow gradation of the hominid limbo. This postulate stands upon the theories of Neural Darwinism and affective neuroscience as well as upon Pinker's proposal of language as an adaptation to the cognitive niche, i.e. as the result of a biological evolution.[300] It is obvious that human syntax allows a precision in the transfer of information that we cannot find in any other mammal, but if we examine human mythology and history, it is also obvious that the content of our communications belongs basically to the emotional realm, and that such communications have relevance in relation to very specific survival scenarios. The thesis that I present here, of an emotional origin of human language, is but a variation of the basic assumptions of some contemporary theories of socio-biological and anthropological evolutionism whose roots can be traced back to Democritus - who sustained that human language was developed in a process of communication of emotions-, Epicenus, Lucretius, and later, in the modern world, to Vico and Rousseau in the 18th Century and Charles Darwin in the 19th Century.

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[299] His theses are based in those that Jerry Fodor expounded in *The Modularity of Mind.* See Stephen Mithen. *Arqueología de la mente.* Crítica. Barcelona. 1998.

We have considered the valuative character of the processes of primary consciousness, the ordering of homeostatic processes following survival criteria, and yet, the action of valuation occurs even in simpler processes than those associated with primary consciousness. Affective neuroscience is showing that the valuation systems for a particular species, those that control the inner homeostasis of the organism (pulse, breathing, endocrine functions, the autonomous system) and the relations to the environment, are determined by evolutionary selection. Valuation systems operate by constraining the categorization domains to the organic functions that have been reaffirmed by evolution. The biological value is the result of the biochemical punishments and rewards that are given to the cells by the neurotransmitters, a fact which implies that the valuation process follows the conditions established by biological efficiency, for the primitive function of the valuation processes is to make sure that the organism remains within the homeostatic interval of survival, an action which is performed by the continuous monitoring of the appropriate parameters, balancing any possible deviation from homeostasis.[301] The simplest valuations are linked to pleasure and pain, providing a basic semantics for the categorization processes, although the final referent for pleasure and pain is still survival. Therefore, the basic emotions use the circuits of pleasure and pain as their own elements, furthermore, the socio-emotional systems (especially, mother care and sociability) seem to be evolutionary developments of general systems of pain. We could speak of a general recursive process of semantic ascension which coincides with the process of increasing complexity that we call organic evolution. Here I understand the term semantics in a broader sense than linguistics or psychology give to the concept. While linguistics uses it in relation to the connotative-denotative sense of human languages, and psychology in relation to the domain of explicit factual memory (knowledge of the world),[302] I understand by semantics the interpretation of a system, any mapping or assignment of identities between the elements of two sets. Such an assignment of identities follows a self-poetic principle of economy by which the processes of a system form new synthetic units of properties which in turn produce new interactions, in an ascending scale. The protein system of the organism is interpreted in terms of cellular workings, which, although conditioned by molecular laws, produce the synthesis of new processes of emergent complexity with a syntax of their own. And so it happens, in ascension, with other organic systems until we reach the semantics of our ordinary language, and we interpret, for instance, a little discomfort as thirst, acting accordingly to solve our want. When I take a glass with the intention of drinking water I do not think my action in terms of biochemical unbalances or homeostasis (unless I find myself in an emergency situation), but from a social point of view, as another vital action in an specific social milieu, and I will look for water or any other thirst quenching liquid in accordance to my environment, guiding my actions with some concrete social semantics which do not take molecules into account. Every semantic scenario functions with its own relations of self-identity and self-diversity. A semantically higher scenario, like my interpretation of thirst in social terms, is conditioned by the lower scenario, but those conditions are met following the syntactic workings of the symbolic elements of the higher semantic order.

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[300] Steven Pinker, *Language as an adaptation to the cognitive niche*. In *Language Evolution*. Christiansen, Morten H; Kirby, Simon. Editors. Oxford University Press. Oxford, New York. 2003. p.p. 22-37.

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[301] Cf. Antonio Damasio. *Y el cerebro creó al hombre* (*Self comes to mind*). Trans. Ferrán Meler Ortí. Editorial Destino. Barcelona 2010. p.85.

[302] As opposed to knowledge about events in our personal life.

Can we define a zero term for semantic recursion? It is difficult to answer this mythological question. Obviously we could define it and adopt it by convention, but, what would be the epistemological value of such a definition? A first determination for semantic recursion, consistent with the present state of our sciences, could be the first forms of life, the predecessor of the eukaryote and prokaryote cells that lived 3.900 million years ago. Although it might seem absurd to propose any form of rationality for the bacteria, we can think of them as ordered systems which meet the conditionings of their genetic code, adapting interactively with their environment, and being, in a way, very simple expressions of intelligence. For our purpose of understanding the origin of emotions and rational thinking, it is enough to place the beginning of recursion in the global mappings as defined by Neural Darwinism, i.e. in organisms with neurons.

The ability to use symbolic languages has been usually mistaken with rationality, as it was the case of Cassirer. Several difficulties appeared when trying to fit an ethical definition of rationality with the specific cultural developments of the turbulent human history, so a distinction between a rational language, which operates with concepts, and a fuzzier emotional one had to be made.[303] Such a distinction does not take into account the outlined theory of the evolution of the neural systems, but it merely calls emotional the content of the communication of n-ary emotions, as expressed for instance in the arts, without considering their link to basic emotional systems. The fundamental content of our linguistic communications is emotionally n-ary, but this does not mean that our complex emotions are a mere chaos, for their origin and link to basic emotions give them not only a strict order, but in a sense, an inexorable one. Living beings follow clear homeostatic principles of order, and the emotional organization that still leads our lives today, and will continue to do so as long as our human systems of survival and reproduction follow the general principles of life on Earth, can only be described as irrational only from the transcendentalist point of view, whose definition of reason denies, point by point, the physiological drives of living beings, with the exception of a divinized maternity and paternity.

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[303] Cf. Cassirer. *Philosophycal Anthropology*. Cited Spanish Edition. p.p.48-49.

There is a general agreement about the differences in rationality between human and animals among practically all philosophical points of view. If we substitute the terms *animal* and *human* for *vital action* and *symbolic action*, we could clarify their difference without emphasizing their oppositions, which are basically metaphysical beliefs. Obviously, this distinction is grounded on symbolic action, it is a human linguistic difference, but we can talk about life because we are life, and the conceptual structures that we build are nothing but ways in which life organizes itself and not something alien to it. We started out from symbolization, from our humanity, and it is within the symbolization process that we have built our *Weltanschauung.* The question of what specific *Weltanschauung* did the first homo sapiens have, can be nothing but an object of our speculation, although, if we observe the archaic myths that still have a social function today, we can notice that such tales contain elements that are both near and far from our present conception of life and the universe. They are near in the sense that we can observe in them some of our own symbolic elements related to the basic emotions, sometimes using different objects, other times with the same old fears and anxieties about our lives and the welfare of our children and community, as it could not be otherwise. But they are also far away due to the huge cultural mediation of n-ary emotions and the sophisticated ways in which we process information, the metasymbolization that unnoticeably leads our lives. The gap between cultures with and without writing is no longer just a matter of the objectification of memory, that great achievement of preserving the information about the group independently of individual abilities, but a process of axiological relativization that started only a century ago in which the memories of the species were metasymbolized from the point of view of the scientific hypertext and the mature monetary metaphysics developed after the second industrial revolution. Metasymbolization is as much a question of defining texts of order *n* for the treatment of texts of order *n-1* (texts of order *n* used in the regulation of social activities of increasing complexity which integrate different mythological frames), as it is a question of the development of a metatheoretical rationality which could be used in such a treatment of formal systems. Both the hypertext and the monetary metaphysics work with cognitive procedures which go beyond the abilities of the isolated human brain, with calculations that can only be carried out by supercomputers, and which define a new epistemological space. The world of human symbolization is not homogeneous anymore. The homogeneity was first broken with the invention of writing, and the gap became wider with the development of metamathematics that ended up in the construction of symbolic machines which changed the information flux in social systems. Neither is homogeneous the animal world that we believe it lays at the other side of an imaginary abyss. Even though big apes, our present ancestors, do not communicate with the fluidity and complexity of human speech, they show intelligent behavior, they learn quickly from new situations and have a rather sophisticated social life compared to that of fishes and reptiles. Their emotional system, integrated around the group's protocols and maternity, allows them a flexible behavior, anticipating or differing organic states and processes according to hierarchies of vital goals, id est, they have a kind of minimal buffer for the modulation of emotional protocols not present in animals without primary consciousness. We could outline seven nodes within the continuum of neuronal evolution based on certain semantic scenarios that, from our human point of view, are useful to the synthetic understanding of language evolution at life's bosom. Besides the three already mentioned of neural categorization (initiated about 540 million years ago), primary consciousness (between 250-200 million years ago) and n-ary consciousness[304] (about 30 million years ago), we find the scenarios of human symbolization which constitute the process of mythologization that we will be studying in the rest of this work, and that, in a very general manner, can be divided into the proto-linguistic scenarios (200.000-50.000 B.C.), the oral (until the invention of writing, around 3200 B.C. in Mesopotamia, and 600 B.C. in Mesoamerica),[305] the grammatologic (up until the 20th Century) and the metalogic or metasymbolic (since the beginning of the 20th Century).

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[304] Or integration of the emotional system into a complex of restrictive regulation among the different systems, from the control of the social emotions in which the group's life, organized out of offspring caring, operates as an axis of fundamental value.

An emotional origin of language implies that grammaticalization is a subsequent development to that of semantics, a modulatory tool which improved communication allowing social synergy and a higher control of the environment, as well as (in opposition to Chomskian and mythological traditional theories) the continuity of the animal world into the human, of the vital world into the symbolic. Our most abstract developments have their basis on specific vital processes of survival, and language thus understood is a tool which allows us to understand life, and think synthetically the different semantic scenarios of evolution. The development of grammar from semantics is the development of the narrative capability, the ability to transmit complex information about non present space-time scenarios, something that allowed a development of cultural memory and the collective identity linked with it. In the same way as proto-languages led the emotional integrated (n-ary) tapestry into a new degree of complexity, the narratives of identity or myths generated a new reality, specifically human, in which the old life's valuations were configured into supernatural worlds. The later process of writing entailed a conscious and ordered symbolization that allowed, on the one hand, the development of previously unknown epistemological modulators, those of mathematics (by the control of magnitude) and logic (which allowed the formal control of language itself), and on the other, an objectification of memory without the limits of the capacity of an individual organism, which implied a new transformation of the collective identity.

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[305] According to the information of Larkin Mitchell, Earliest Egyptian Glyphs (Archaeology Magazine. Archeological Institute of America. February-29-2012. Web.), it seems that there are Egyptian glyphs a couple of centuries earlier. The use of abstract symbols in caves has a minimal antiquity of 35.000 years as shows the study of Genevieve von Petzinger of twenty two geometric symbols found in caves all over the world and which seem to be an iconic language of Shamanistic origin. See Bradsahwfoundation.com. Web. The use of the term oral scenarios does not provide a specific difference of this scenario in relation to the rest from the property of orality, common to all the others, it simply serves to distinguish it from the previous phase, proto-linguistic, as a phase of non-written full communication.

2.4 Emotionality and Rationality of Myths

Our world image is a cognitive-emotional construction based on the evaluations of that which threatens our existence. Modern science is the final result of a process of continuous rationality in which coexist inseparably integrated emotional and logical elements. The very same process of investigation is the development of the emotion of seeking, the resolutory anticipation of existential problems. The myths of humanity gather this cognitive-emotional image of the world, setting it in language and applying to it a social intersubjective content which erroneously and inevitably is adopted as a goal. Neither *the thing in itself* has an epistemological sense, as it was understood since the Kantian critique (it would never be cognoscible if it did not maintain a minimum relation with the subject), nor is emotionally relevant, unless it may be used as an exomorphic narrative referent, as a social axiom. The world only exists in relation to the social subject's survival. Mythologies, whether those of the traditional religions or the new materialists myths (which have dominated and dominate human societies) are a good proof of that. For thousands of years, human beings have lived with mythological constructions in which the world has been devaluated as an illusion or as a temporary stage between other two stages which are more stable. The survival of the community in other worlds, in *netherworlds* populated by ancestors and nirvanas in which the biological needs are always satisfied, have determined the images that we have formed of this one, and we have persisted in maintaining archaic representations despite the fact that they were refuted long time ago by experience. This heritage of mistakes does not seem to be easily renounceable.

Our myths express a wide range of n-ary emotions, but their core is constituted by the basic ones. The emotion of self-stimulation has been recognized, under the name of *desire,* very early in mythology, even though its range of action was not understood until the experimentation of affective neuroscience. In the doctrines of the three souls of the onto-theological tradition, the Platonic as well as that of the three *gunas* that we find in the Hindu *Bhagavad-Ghita,*[306] there is a distinction between the actions of an intellective soul, of a passionate soul, and of a third soul which is called vegetative. Each of these souls is in charge of different functions of the organism, and the predominance of one or two over the rest determines the personality. This model also applies to the social body, an organism which needs these three different groups of organizational drive, and serves as a metaphysical justification for the existence of castes or classes. Within this metaphysical schema, an emotion consisting on the self-stimulation of the organism in order to carry out its metabolic activities, would belong to two of the three categories: to the passionate (*rajas* in Hinduism) and to the vegetative or appetitive (*tamas*). Even though the valuation of the passionate aspect is more favorable in the Greek case than in the Hindu, the appetitive or vegetative aspect is in direct conflict with reason and must be tempered or abandoned in favor of the intellective soul and the *satvas.* To Plato, it will be the philosopher king who, through the intellect, will accomplish this control over himself and over the city, whereas in Hinduism it will be the priest or man of knowledge, defined as such for knowing this doctrine. However, the system of seeking or self-stimulation, is not only at the basis of the most instinctive impulses towards the search for food, shelter, sex, etc., but it is linked also to learning, investigation, exploration, and in its

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[306] See Plato, *Republic.* 435 and s.q. and *Bhagavad Ghita.* Chapt. 14. In the ethical works of Aristotle it appears as one of the passions under the name of *orexis.*

most stimulated versions, to the so called spiritual quests,[307] that is, it underlies all activities of the old doctrines of the soul. Subsequent philosophical theories, even the most observational ones, like that of Aristotle, were prone to an appetitive classification of this emotion, a tendency that was maintained almost unaltered until William James.[308] The emotion of self-stimulation, which in popular and artistic psychology has been frequently called *vitality*, corresponds with the concept developed by Nietzsche of *will to power.* To Nietzsche, the will to power is already a form of knowledge grounded on biology, on the need that the preservation of life imposes, a kind of knowledge that generates valuations which favor survival.[309] In fact, Nietzsche hoped to elaborate a unitary conception of psychology after the concept of *will to power,* proclaiming it as the primitive form of affection from which the others emerge.[310] For its part, behaviorism, by being less prone to consider internal causes of behavior, and in the absence of brain maps that would show the neural typology of the emotions, had interpreted the evident impulse for searching shown by the experimental animals as a mere function of the reward for a specific behavior.

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[307] Panksepp suggests a link of the system, mediated with the cortex, to religious and mystical experiences, and the derived conclusions of such states. In *Affective Neuroscience.* Ed. Cit. p.145.

[308] *The Principles of Psychology.* Vol.II. Ed. Cit. p.p.472-473. However, in James there is not a sufficiently clear understanding of instincts or emotions so as to enable us to understand from his theory the fundamental importance that this system has for the behavior of the organism. In part, because of the limitations of the experimental science of the epoch, but also due to his own ontological assumptions surrounding will and free will, James sustained that there are no special emotional centers for emotion in the brain, but they correspond with the cortical sensory-motor centers, that is, an additional cortical processing transforms the perceived objects into emotional objects.

[309] See Friedrich Nietzsche. *The Will to Power.* Book Three: *Principles of a New Evaluation.* p.p.261-324.

[310] Cf. Friedrich Nietzsche. *Theory of the Will to Power and Values.* #688. *The Will to Power.* Ed. Cit. p.366.

Rage, for its part, has deep roots in the religious and social world, where we find gods of destruction and violence in all the mythologies of humanity, in polytheistic as well as in monotheistic, to such an extent that if the criterion were to exclude the human narratives that expressed some kind of rage, not a single mythology would pass the requirement. With these we could include also materialist mythologies, like that of Marxism, or the allegedly lay republics that have flourished since the Enlightenment. We are a violent species, like many others, and the development of deductive and metalinguistic abilities has not diminished such tendency a bit: the destructive fury awaits its opportunity at any liminal situation.[311] Our violence is in fact associated with more than one emotion, is not only the patrimony of rage. The invasive violence of a human community over another in order to control its resources (to steal), would be a type of predatory violence, linked to the emotion of seeking, whereas self-defense violence would be linked to rage, and sexual male rivalry would correspond to action protocols within this primary emotion. Communal human actions already entail a mixture of primary emotions that make them, in principle, more complex, even though the component of irate aggression is distinguishable as the means to maintain the homeostatic social order.

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[311] In this sense, contemporary theses, like those of Pinker, which affirm that *statistically* we are much more peaceful now than in the past, something which does not imply that we are not violent, present a self-complacent view of social reality that makes a meager favor to the possibilities of improvement, trivializing the numbers of victims of the world wars and the genocides of the 20th and 21st Centuries. See the book of Steven Pinker *The Better Angels of Our Nature: Why Violence has Declined?* Viking. Penguin Group. New York. 2011.

Rage and fear integrate a ubiquitous and central emotional tandem in theological myths and in the emotional life of the individuals who live according to them. With the exception of some myths of pre-urban communities, the relationship between gods and men has always been mediated by these two emotions, to the extent that it would be hard to imagine the religious experience without them. In the Greek thinkers, we find a specific term to denote the emotion of religious fear, *phriké*,[312] which happens in the presence of the god. This fear implicates an emotional preparation for catharsis, through which the emotion is annulled into a psychological comprehension of a wider scope,[313] into an n-ary emotional web. We find examples of this religious fear in the theophany of Brahman to Arjun in the Bhagavad-Ghita, in which the god shows his absolute shape, a form which contains all other individual forms whose irresistible beauty is parallel to his destructive capacity, and is more than what anyone can endure, for it can only be experienced as terror,[314] or in the irate impulses of Yahweh, Allah, Indra, Marduk, Seth, Zeus, and many others. *Phriké* is produced due to the contrast between the limitation of the psychological individuality and the unlimited extension of the notion of the divine and nature experienced in its processes of change. Analogous to this vision is the one that the seer Tiresias from Greek mythology has -who is blinded when he sees Athena bathing naked-, and in general the majority of the visions of the divinity that in any mythology the prophets and divine mediators have. The emotion of fear, by working actively during learning, becomes, in its religious and mythological modulation, a tremendously persuasive instrument for enculturation, and is to a great extent responsible for the seriousness and solemnity achieved by our own mythological tales compared to those of other cultures, for they are reinforced by the power that the group exerts in order to maintain its integrity.

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[312] See Plato. *Phaedo.* 251 a. Ed. Cit. p.497. And also Aristotle, *On the Soul.* 3.5.

[313] See Thomas Gould. *The Ancient Quarrel between Poetry and Philosophy.* Princeton University Press. Princeton, NJ. 1991. p.p.55-62.

Myths have been a traditional effective way to regulate the social relations that are in one way or another linked with sex. They offer the acceptable moral models and the relationships of kinship are protocolized in catalogues of emotions and actions for the different moments of life. The sexual emotion has worked also as a tool of knowledge, as an instrument to understand the world and give it meaning. Probably, the epistemological dimension of the sexual emotion has been responsible for the most successful generation of meaning for human life. Long before the Modern science of the 17th Century saw mathematical principles in the order of the universe, before we could explain the subatomic randomness and that of genetic mutations, sexual emotions gave us an intuitive image of the universe as a great womb. In Hindu mythology, Prakriti is kindled by the sperm of the Purusha, and several mithologies see the universe as the work of a Father or a Great Mother who create and take care of their eternally infantile offspring. The meaning of life was sexual, reproductive, and violence and toils, fears and frustrations were but moments of a cosmic scene orchestrated around the family group and its extension, the village or city, a scenario that was directed by this very same reproductive force. Sex as an epistemological emotion has shaped the human world and the cosmos through myths, it has contributed to provide us with the idea, useful but absurd, that the universe has a meaning. Sex, and its associated emotions of mother care and the social emotion, are projected over the universe and link its origin to human life, the macrocosm follows the same principles of family group reproduction followed by the microcosm. This animalization of the cosmos, that sacralizes and universalizes life, allows the harmonization of the myths that narrate the mythological determinations that account for the origins, and the myths in which the economic determinations appear, those which organize the activity of the group. When such a harmonization occurs we say that life makes sense at a collective level. The meaning of life is, therefore, a concept conditioned by representations of reproductive and social actions in general, and it has no validity outside such a conditioning. Therefore, when from the perspectives of physics -a discipline of modern science that is today the artificer of the narratives about origins-, a voice is given to that which derives from the cosmological theories of the present, being stated that the more comprehensible the universe may seem the more without sense it may appear;[315] there is no paradox expressed in such statement, but it is simply being validated the phenomenon of the emotional content of meaning, independent, to a certain degree, of the empirico-rational constructions that we make, constructions which are linkable to the narratives of psychological identity insofar as they may be translatable into social emotions. The meaning of the universe is only a concept which is valid within a mythic emotional schema, because the image of the universe over which we project sense or nonsense is a human construction, something which does not diminish its empirical validity at the level of the individual psychology. One of the most common forms for the meaning of life is the one established by family and collective relationships. Thus, the maternal emotion in mythology shows life as an amazing and self-contained phenomenon, incomprehensible to itself. The ignorance of the biological processes that lead to birth, and in general, that constitute the organism, makes of this emotion the basis for the mythico-religious emotion of mystery. The mystery of motherhood is identified with the mystery of life and of the universe. The maternal emotion has been considered sacred in the mythologies of the Great Mother, as attested by the Eleusinian mysteries, those of Isis, Cybele, or the cult to Kali. Coupled with the sexual emotion, it constitutes the foundation for the notion of meaning and the form of the first epistemological representations about the origin of the universe, even though separately, the maternal emotion has a dimension of its own. However, the scientific understanding of life compromises the religious dimension of the maternal emotion and of any other emotion: an injection of oxytocin in the ventral tegmental area produces maternal behavior in an animal who seconds before did not exhibit such a behavior, as well as drugs that block the beta-norepinephrine receptors are capable of calming down a rage attack.[316] Curiously enough, part of this sacred content of the unknown, thought as mystery, has been inherited by modern science, which in its myths thinks that is unveiling the true and only way of things. As an example, it suffices to observe the inevitable metaphysical content of the models of the universe as a totality with a beginning and an end.

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[314] "Tell me who Thou art with form so terrible. Salutations to Thee, O Thou Great Godhead, have mercy." 11.31. In *A Sourcebook in Indian Philosophy.* Edited by Sarvepalli Radhakrishnan and Charles A. Moore. Princeton University Press. Princeton. 1989. p.140.

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[315] Cf. Steven Weinberg. *Los Tres Primeros Minutos del Universo.* Alianza Editorial. Madrid. 1989. p.132.

In the same way, the social or socio-organic emotion is responsible for the sacralization of the group, whether in its democratic or in its aristocratic structure, via the sacralization of the myth that contains the social identity. The group, or the chosen people, or the glorious country, is the center of the world, in that peculiar form of hypostasis that conforms the identity of the community not only with its present members, but also with the ancestors and those of the future. The expulsion from the group, the excommunication, the exile, is worse than death, for it involves, besides this, oblivion, the total disappearance and nothingness. The social emotion, in its negative aspect, is a type of violence of abandonment similar to fear, whereas in its positive aspect is the sacralization of the group, a process by which the limits of the individual are extended beyond his life, into something indefinite but of his own, which he feels as powerful and nourishing, divine. The emotion is responsible for the development of the basic social bonds in conjunction with the sexual and the maternal emotion, but the social emotion alone is sufficient, since it has its own neural circuit, to encourage collective behaviors and discourage individual adventures. Oxytocin is present in the sexual emotion (during orgasm), but also in the maternal and in the social, that is, in the group of the social emotions, and if it favors the formation and preservation of this kind of memories, we can expect that myths will mainly gather memories that are relevant to these emotions. This would partly explain the uniformity of human mythologems, how the history of the group, in its most economic and reproductive dimensions, focuses its attention and conditions its ontology and epistemology.

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[316] See Panksepp, *Affective Neuroscience.* Ed. Cit. p.p.202 and 253.

For its part, the emotion of play has a very important role in most mythologies, in the representations of games and contests, as well as in the divine figures of the playful and trickster god, like Hermes, Prometheus, Loki, Odin, Maui, Eshu (Yoruba), the Coyote of the North American Crow,[317] the raven, and others. Play and amusement, although not always compatible amongst each other, are part of traditional narratives as didactic and socializing motifs. In some cases, play is imbricated in the deepest values, as it can be observed in the dice game that Yudhisthira plays in the *Mahabharata*, in which he bets and loses against Duryodhana, his reign, his wife, his freedom and that of his brothers, a passage in which the game of chance is related to the Vedic ritual for the selection of a new king.[318] Games as ritual, this time athletic, are present at the end of the *Iliad* for the distribution of Achilles' weapons. In fact, besides the Pythic games that Apollo establishes at Delphi, two of the most important heroes of Greek religion, Heracles and Theseus, are associated with the institution of athletic games.[319] In Mesoamerican religions, ball games obeyed ritual purposes perfectly delimited, and not very different to those of the transformation of war into a game that we see in Greece, turning the game into a symbolic war that serves not only to channel violence or as a process of military training, but also as a token of the political power capable of organizing spectacles. The field of the ball game that the Zayua ruler Our Venerable Noble builds in order to establish peace with his powerful neighbors, is made of emerald, ruby, diamond and red quartz,[320] which, besides providing the color symbology, supposes an spectacular display of constructive energy, which in mythological terms would be exchangeable for the concept of *mana*, or economico-religious power of divine character. Circus games in the imperial Rome were funded by the emperor or members of his family, and the competition to organize the best spectacle had as a goal to gain the favor of the people by entertaining them, and to show the grandeur of the ruling power, which contributed to the strengthening of the bond that the social emotion provides, and reaffirmed the identity of the community. In this sense, games fulfilled, in part, the functions that the ritualized myth exerted in the different festivals, ceremonies and religious rituals, complementing them as an added element. The functions that in current societies sport events perform are not very different from those of the mythological complementation that they once had, although today they complement different rituals.

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[317] And also the Karuk, the Winnebago, and others.

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[318] Cf. J.A.B. van Buitenen. *Introduction to the Book of the Assembly Hall. The Mahabharata*. The University of Chicago press. Volume 2. Chicago. 1981. p.p.27-28. That the decision of such an issue may be left to the dice, makes plenty of sense in the cases in which the contenders present equal strength and merits in order to be elected as the dominant dynasty. Of we also consider, as the *Rigveda* considers (Mandala 1.41.9.), that it is the divinity who has the four dice of destiny in hand, such election is equivalent to a traditional divinatory process.

[319] Heracles with the Olympic games, and Theseus with the Isthmic games at Corinth.

N-ary emotions, in spite of their complexity, can be easily traced to the basic emotions that originated them. The simplest semantic scenarios are reinterpreted in processes of increasing symbolization, in the terms of the emotional sublimation proposed by Freud,[321] as well as in the production of symbolic structures with emergent elements capable of inverting even the valuations of the simplest semantic scenarios, as is the case of religious nihilism. Thus, for example, in literature, we can trace the emotion of immortality up to the tale of *Gilgamesh* (2500-1500 B.Z.), although it does not seem to be an unknown emotion to Paleolithic societies and in general to all those societies that have practiced funerary rituals, hence, probably even present in other hominid species. In any case, immortality such as it is understood in the *Gilgamesh* can be perfectly put in relation with the immortality of later religions, inheritors of the old Mesopotamian ones. In the myth of *Gilgamesh*, the desire for immortality overcomes the hero after the death of his friend Enkidu, when the fear of his own death overtakes him and he decides to enter into the underworld in order to find the ancestor Utnapishtim, a human who attained immortality, with the goal of acquiring the knowledge of his secret.[322] We have the emotion of fear as trigger of the desire for eternal life, a fear which anticipates a situation that has not been produced yet, which is developed by induction from the observation of the death that overtakes all living beings. This type of fear, which other mammals do not experience, for they are not capable of anticipating their own death, appears when imagining the loss of the individuation and the separation from the group, from the everyday social life, by constructing a scenario in which all vital actions and emotional bonds disappear. The loss of the individuation alone is not enough for such a fear and pain to appear, for individuation is equally dissolved in communal rites, and it is only in relation to others that life has meaning. The socio-organic emotion is linked to the neural circuits of pain and stress, and its dimension is basically negative. Most mythologies solved the problem of the fear of death by imagining a later existence, more or less blissful, in which the group continues and the relationships are maintained. There are no tales of immortality in which the deceased follows a completely isolated existence, like a blissful and lonely monad. With the fear of death, is anticipated the frustration of the rest of emotions, which produces rage, as the *Gilgamesh* illustrates. The anticipation of the negation of the emotional contents that constitute the individual activates the search for immortality, although this time the emotional system focuses its will to power over a non-existent object. Without the figure of the gods, the emotion experienced by *Gilgamesh* is not possible. The fear he feels is not simply for dying or disappearing, in a universe where every living being disappears, but because the contrast with the possibility of not dying, as it happens with the gods, and the uncertainty of a pseudo life beyond, over which he is not in control, enlivens a more complex fear in which the perspective of a prolonged frustration, semi-conscious, modulates the rest of the basic emotions. Nevertheless, it is not enough to be able to form representations of immortality like that of the gods in order to achieve the idea of immortality, just as it happens to *Gilgamesh* –who does not attain his purpose. It becomes necessary an intermediary representation that may agglutinate human and animal life, and also such a representation will have to be understood as something that prevails beyond the individual creations and destructions, being able to link human nature with the gods in a positive manner. Such an idea never had a constant shape in mythological development. It started by being something indefinite, common to all living beings and things, an *anima mundi,* to later be transformed into the figure of the gods, pressured by forces of social origin, and even later, under the influence of other economic actions, into an absolute universal principle. In the case of the *Gilgamesh,* we find ourselves at the time of the divine representations –through which we shaped our identity and that of the universe- in which the link with the divine did not have the positive content that may have allowed the human being to become immortal, a limitation that must be understood in terms of social order, as can be observed in the vulgarization of immortality that will take place in the mysteries of Osiris in Egypt.[323] In allegorical terms: Gilgamesh is not able to withdraw from sleeping –as the gods demand in order to be like them-, he is not able to surmount the limits of his own physiological individuality, and he never will, for the immortality of the gods is of a symbolical degree, is the immortality of language, the mythic narrative itself.

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[320] See the purpose of the ruler *Our Venerable Noble* in: Alfredo López Austin, and Leonardo López Luján. *The Myth and Reality of Zuyúa.* In *Mesoamerica's Classic Heritage*. Edited by David Carrasco et al. University Press of Colorado. Boulder. 2000. p.45.

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[321] Freud maintains this idea only for the sexual emotion, and its redirection towards social emotions. See Sigmund Freud, *The Future of an Illusion: Civilization and its Discontents.* Pacific Publishing Studio. Seattle (Washington) 2010.

[322] See *Gilgamesh* in *The Norton Anthology of World Literature.* Volume A. W.W. Sarah Lawall and Maynard Mack (eds.). Norton & Company. New York. 2002. p.p.10-41.

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[323] This issue will be discussed in *Mythopoetics. The Symbolic Construction of Human Identity.* Volume III: Mythico-Ritual Axes. Oscar E. Muñoz. Mandala Ediciones. Madrid. (Not yet released in its English translation). (See also Complete Spanish Edition: *Mitopoética. La Construcción Simbólica de la Identidad Humana.* Mandala Ediciones. Madrid. 2013.)

The emotion of immortality is not a positive emotion, in the sense that nobody has that experience and could never have it, for one’s own life is only experienced at a given moment. If I could live for thousands of millions of years (or an unlimited sequence of them) I could only say that I live in each of those moments, but never that I am immortal. It is an imaginary projection that takes the shape of a specific belief, but its foundation is the impulse to live that we find in the neural dopamine circuits, and in even simpler semantic scenarios, in the replicative ability of the DNA. What we can experience from life is the emotion of the faith in immortality, that is, we experience faith, and in the same manner, when we do not have such a belief, what we experience is not mortality but a mere projection of our emotions enculturated through some specific myths. The shape that the secondary emotion takes (or the n-ary in general) depends on the myth in which it has been elaborated. The emotion of eternity that the concept of reincarnation incites, or the eternity of a torture in some underworld created by a crazy priest of feverish and perverse imagination, is very different to the limbo of the Hades where the days and years are hardly distinguishable one from the other, or the eternity for Muslim males in the arms of the houris. In some cases, we have projected sex over the emotion of immortality, in others, rage and pain, in some others, like the Valhalla, play and camaraderie amongst warriors, and in many cases, simply the social emotions of the group and progeny: an emotion of oxytocin and endorphin wellbeing in which we live without effort and pain. The desire for eternal life, the will to power accompanying life, the destabilizing impulse that continuously seeks homeostasis, to later be destabilized again and continue with a new balance, that never-ending cellular process in which self-replicating proteins have been passed on for almost four thousand million years, is elaborated in an *n-ary* manner into an emotion which is hardly identified as such. It is hard for us to think that our beliefs are emotions, that something so contingent may sustain the edifice of our personality and our society, that something as apparently sophisticated and complex as our longing for immortality may be the result of iterations of relatively simple animal actions. However, emotions are as contingent or as necessary as life may be, they are not something apart from it.

The developments that the emotion of immortality has had since writing have crystalized in the systems of values of the great religions as its more complex form, for the development of the most recent scientific and meta-symbolic myths has been incapable of elaborating psychological images of eternity with social and individual relevance. In these religions, immortality is conditioned to the behavior in life in relation to others, and the degrees of bliss, from the Hindu *ananda* to the Buddhist *nirvana,* through the paradises of Christianism or Islam, or the infernos of torment, are not distinguishable from the physiological ecstasies or tortures that we experience in life. With the development of writing, immortality gradually mingled with the emotion of love. The eternity of the blessed is imagined like that of lovers, and the desire for eternity (the dopaminic search without object) finds its image in the beloved. An interesting transformation of the desiring emotion of love is the one produced when the person who is the object of love is substituted by an imaginary person, even by an ideal, like that of the concept of *beauty*. We find antecedents in Egypt around the 1300 B.Z., in the writings in which these emotions are expressed,[324] as it will later appear in the Solomonic *Song of Songs,* or in the Chinese erotic poetry of the *Classic of Poetry* (1000-600 B.Z.),[325] or in the verses of Sappho of Lesbos and some other Greek poets, and later in sufi poetry and the troubadours, where the mimetic image of the divine is superimposed over the human image of the beloved. The beloved is a symbol of another symbol, the entire nature, which is understood as an *Eternal Feminine* in which the poet seeks his own image and wonders.[326] The first images of immortality, like the ones we find in the Mesopotamian and Egyptian religions, had simply imagined a continuity of life: gods and immortals continue doing what they did in life, eat, fight, generate gods, etc., but the merging of immortality with love, a union in which all basic emotions concur, makes of the afterlife an ineffable ecstasy. The emotion of love consists of a collection of different n-ary emotions, depending on which of the basic emotions intervenes more, that of sex, of maternity or the socio-organic. It concerns, then, the social emotions which include behaviors of attraction, protection, solidarity, and similar others, which allow the formation and maintenance of human collectives, that is, love implies a desire for permanence, an enamored immortality. Let us take, for example, the so called New Law of the Christian *Gospel,* which reduces the Mosaic Law to a double moral code of love for God and for thy neighbors. The love for God within Christianity is an n-ary emotion composed of a parent-child emotional web and a desire for an eternal life of joy and bliss. For its part, the love for others, for thy neighbors, is the fusion of the group's emotions under the idea of brotherhood. We can say that the New Law is an emotional web of love and desire for immortality in a blissful brotherhood governed by a father.

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[324] In these poems are gathered the loving emotions of men and women which are almost identical to the ones expressed in any subsequent literature, even in one of the songs, *My love is one and only, without peer,* there are sacred connotations in the treatment of the beloved. See *Ancient Egyptian Poetry. Love Songs.* In *The Norton Anthology of World Literature.* Volume A. Ed. Cit. p.49.

[325] Poems which gather everyday life themes of the Chou period.

[326] Cf. Charles Mela. *Le Beau Trouvé. Etudes de theorie et de critique litteraires sur l'art des trouveurs au Mogen Age.* Paradigme Ed. Caen 1993. p.214, in the essay: *Le Miroir Perrilleux on l'alchimie de la Rose.*

Emotions have not only made language possible, providing the content for animal communications, but they are protolanguages per se, and later on, languages with full rights which are established on evolutionary syntaxes, ever more complex in the narrative action. The narrative action, the imaginative construction of non-present spatio-temporal scenarios, with all its associated objects and emotions, transformed emotions into different symbolic objects which the manipulation of writing, not limited by the blackboard memory, transformed with a much wider scope than the initially physiological one, although always linked to it. Maternal love has developed until becoming a religious emotion gathered in the religions of the Great Mother (and its survival in the Christianity and the Hinduism), in which the reproductive process and the caring for the offspring is invested with numinous content, and is a symbol of order and purpose of the universe. Myths generate their symbolic objects, and for a moment – which can last the entire existence of a human community- we find ourselves outside the biological world, in a human world built upon ideas that seem to apply an accelerated *exaptation* to the neural systems and to turn them into something else. The emotion of the archaic myths and its subsequent development in the great religions has been taken even further, to the meta-literary and meta-symbolic analysis, in which the old myths are contrasted with each other and with different branches of knowledge, like psychology, anthropology, linguistics and the life sciences, in an n-ary narrative of continuous rationality that constitutes a general image of identity of the human being.

C. Some Conclusions

The ethico-rational treatment that philosophy has made of emotions, from Aristotle to Habermas, has only offered an image of the human being conditioned to ontological assumptions that are indistinguishable from traditional religious mythologies, in which our species, *touched by the divine hand,* rose as an exception or a singularity in the universe. After the development of the life sciences during the 19th Century, but specially, after the developments of neuroscientific thought in the 20th Century, a continuist image of the human being with his environment has been gaining pace, supported by the empirical evidences that the evolutionary understanding of life on earth offers to us. Obviously, that this ontology may be more consistent with our experience does not make it less conditioned to our human way of understanding ourselves and the world, even though, its point of departure is the understanding of this limitation that places the *metron* of the universe no longer on the *Anthropos,* but on *Zoe,* life as an open process of continuous rationality in which the homo sapiens is but its most complex link. What philosophy has called emotions are cognitive processes that the living organisms have developed evolutionarily as a response to the environmental geophysical and biological conditionings, a process whose result has been the development of neural functions to which we call languages (first communicative protolanguages), which, due to the architecture of reentry necessary for perception, produced the emergent properties of primary consciousness, a process which evolved into our more complex communicative capacity. Human rationality is the maximum development of this open process of vital communication which generates collective and individual groups and identities.

Our provisional definition of myth[327] characterized them as communicative social actions in which the collective identity was generated as a result of liminal cognitive processes. Now, we can specify these processes as *emotional,* in the sense that is postulated by the theory of emotions here presented. The contents of mythic communication are the basic and n-ary emotional memories, which have proved their evolutionary utility in the pre-human biological milieu, but also in the cultural and historical scenarios of our species. Therefore, we always find in myths matters that, one way or another, have social homeostasis as final referent, with specific assignments of the social persona that corresponds to each individual. The increasing mythological complexity that we observe in the historical development is due not so much to changes in fundamental concepts as to new symbolic combinations, which occurred as a consequence of the more precise control that we have over matter. Myths change when the material conditions change, and at the same time new myths allow to reinterpret the new forms of life, but the constant referent is the emotional biological conditioning. After the Sumerian invention of writing, myths achieved a complexity unknown to prehistoric times, and the general communicative structures in all spheres of life obtained a precision that transformed the ideological and economical structures. This process entailed the development of new n-ary emotions, but its conditioning, as it could not be otherwise, was on the basic emotional systems. In fact, our present emotional structure is not so different from that one. The current religions which explicitly or implicitly follow modern states, the three of the *Book* (Judaism, Christianism, and Islam), Hinduism, Buddhism and Shinto, are emotional developments of urban societies based on the agricultural model, with moral and metaphysical ideas grounded on the n-ary emotions that blossomed after the development of the temple-cities,[328] with productive social structures very different from the ones that an important part of the world population experiences today.

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[327] See *Mythopoetics. The Symbolic Construction of Human Identity. Volume I: Mythic Domain.* Trans. Nur Ferrante. Mandala Ediciones. Madrid. 2013. p.p.188-189.

The onto-theological image of reason that philosophy has developed is full of indemonstrable beliefs inherited from the old metaphysical systems. The opposition between reason and emotion is untenable once we understand the evolutionary development of the neural systems, but it also has to be rejected by the mere observation of the reasoning praxis of human beings. The so called natural reasoning (as opposed to those of formal languages) show clear emotional conditionings in the valuation of experiential scenarios. The conditioning occurs at such a basic physiological level as that of perception itself, and it extends up to the inferential processes, manipulating the logical structure of the reasoning processes to accommodate the beliefs of the thinker. The phylogenetic priority of the subcortical system is complete in liminal situations, but also, the very same reasoning processes, in which the blackboard memory and the reflective evaluation intervene, are biased by beliefs that are established in the firm will to power and survival, acquiring the linguistic structure of some particular myths and historical rites.

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[328] In the period 6500-2400 b.z., approximately. Cities like Ur, Uruk, Kish, Eshunna, Memphis, Heliopolis or Thebes.

If human reason is a tool of emotional origin, as the studies of affective neuroscience performed on mammal brains seem to show, in clear contradiction with the onto-theological conceptions that assigned an extra human value to it, we cannot aspire to understand social actions without understanding emotions, and these within a process of complexification of continuous rationality, in which what we have called *reason* emerged hand by hand with the narratives of human identity. Although we inherited the architecture of our neural systems and the specific physiological structures for our homeostasis, the most complex contents of our emotional valuations are constituted in a complete manner through cultural mechanisms. Over the structure of the neural systems of the social emotions we build a political world that binds us with a spatio-temporal environment of a much greater scope than our individual life, even greater than that of the life of the specific social group in which we find ourselves. There is an organic group as long as there is a language that generates it, not as a foreign entity that acts over the group modifying it, but as a complex functional process of physiological activity that in its action determines its objects, in this case, the communicative group. The larger the complexity of the language, the greater the complexity of the group in relation to the handled scenarios of survival and the objects that are part of it. A metaphysics like that of the great religions, or modern science, cannot be created without a previous development of a linguistic system in which to deal with such conceptual objects, and such languages cannot emerge but as a result of functional physical conditionings that make more complex the interactions of the organic systems. Through our language, from its Paleolithic modalities to the contemporary, artistic, scientific, religious, or economic, our individual mind has been always overflowed by the communal mind in a proportional way to the degree of complexity achieved in each moment. This difference between the individual mind and the communal (a relationship perfectly regulated by the mammalian social emotion), between the personal and limited use of language and the wider use developed by an historical community (not only because of the informative difference, but also in all the hues of emotional modulation for the different acts of life), is reified as the manifestation of something extra-human, extra-individual, which is expressed in the mythic narratives. However, the difference that makes us assign a non-human origin to ourselves and the language in which we have begun to think ourselves, has also a proto-linguistic origin, and plunges its roots in the world of the basic emotions and our animal physiology. Language produces estrangement with respect to the mechanical processes of our nature, its complexity makes us to feel surprised by our more humble animal origins, and only the ideal linguistic objects satisfy the projection of potentiality with which the human being imagines his identity, creating it narratively with such an idealization. The primary and n-ary emotions are the fundamental communicative content of the social persona which generates the mythic narrative, protocolized and actuated in communal rites.

Once the conceptual tools of the mimetico-liminal theory, the theory of emotions and the continuous rationality theory have been introduced, we can characterize mythical communication, or mythical action, as social mimetic actions of symbolization in environments of continuous rationality. Mythical action must be understood as a mythico-ritual action. The theory of continuous rationality allowed us to understand the ritual animal action as a proto-linguistic form of emotional communication between the members of a species in which guidelines for social behavior are established. From this point of view, myths could be thought of as complete linguistic developments of such communicative patterns, in which syntax allows an informative precision by which absent objects and scenarios can be represented with a full cognitive function, not limited any longer to the vital situations in which the content to be communicated had its origin. Myths, however, have not completely displaced rites, because of the greater cognitive efficiency of the word complemented by action, as well as due to the fact that the rite has a direct emotional basic function: is the action par excellence of the socio-organic emotion, it directly produces wellbeing in the participants, due to the production of endorphins and oxytocin associated to the activation of this neural system, which generate the indispensable chemical basis over which to settle the group's narrative of identity, in so far as such substances favor the creation of collective memories.[329]

The mythical narrative acquires its semantic congruence and its formal unity from the very same emotional contents it expresses: narratives and rituals are integrated into a unity of interpretative actions which give value to the vital actions of the group. A definition of mythical action requires a previous determination of the concept of *social action* from the point of view of the theory of continuous rationality. The treatment that philosophy has made of the concept has been within the framework of its opposition to *natural action*, an opposition whose explicative content is very limited, even within the framework of the theories developed by the physical sciences, for it is unsustainable without the ontological compromises of the reification of an objective reality that is independent from the epistemological determination that physiological organisms make. The human being is not an entity independent of the rest of living beings, in fact, his social actions are emotional actions, which he shares with mammals in its most simple forms through the social neural system. Our social actions are at the same time natural actions that occur in an environment of continuous rationality in which we interpret the vital experience by means of cognitive-emotional actions that mimetize such actions of experience, in a reciprocal and open relationship with the environment, characteristic of the adaptive behavior that we call intelligence, and which is ubiquitous –in different degrees of complexity- in all living beings. Mythical actions, as we will see, establish the semantic environment of the vital experience of the human being by means of such mimetic processes, and are fundamental elements which constitute the mythico-ritual structures. We can distinguish two types of mythical actions: those of functional or economic determination[330] which assess (and generate when valuating) the relationships of energetic exchange in the human groups, and the actions of primitive determination, which do the same with the collective and individual relationships of identity. The actions of economic determination and those of primitive determination constitute a mythico-ritual axis, a structure of interpretative mimetic actions of the vital experience from which the human being creates the symbolic reality to which we call world.

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[329] See what has been said in *Mythopoetics: The Symbolic Construction of Human Identity*, Volume II, Chapter 1, concerning the creation of the collective memory and oxytocin.

The narrative personae, or mythical personae, are not entities independent from the narrative action which interprets a vital action, but emerge with the telling. The mythical persona is the social persona, understood not only as the narrator of the myth (the transpersonal community that is reified through the language of an absent narrator), but also as the different personae that emerge with the economic action, the actors of the human drama, whether general personae, like that of *man, woman, young,* or *ancestors, supernatural beings, animal*

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[330] I will use interchangeably the expressions *functional determination* and *economic determination.*

totems, legal personae, or any other kind. According to the symbolic complexity of the actions and personae that appear in the narrative structure of a mythico-ritual axis, we can distinguish different mythical planes, and trace a typology based on the central mythical persona of each plane. Hence, we will distinguish between the narratives of the mythical plane of the *anima mundi,* those of the plane of the *King-God,* those of the plane of the *universal law,* and those that correspond to the plane of the *human law.* Such organization corresponds with the chronological developments of ever more complex mythologies in human communities with a greater number of social interactions. A specific mythico-ritual axis corresponds to one of these four categories. The encounters between axes of different planes are conditioned by the specific structures of their mythical actions, thus, different general scenarios of disruption or continuity of the social order will be produced. In the third volume of Mythopoetics, we will make explicit these relationships between mythical axes and planes, observing the main lines of their developments in the world mythologies, as well as the limits of the symbolic constructions which condition any mythopoetical narrative. These limits will be examined from the concept of *complexity.* The complexity of a mythic plane depends on the process of continuous rationality, in which it is generated what I call the *mythopoetical complexity* or *semantic complexity,* which must be distinguished from the syntactic concepts of complexity with which different sciences operate. The concept of *mythopoeti-*

cal complexity, constructed from the distinction between syntactic complexity (or quantitative[331]) and semantic complexity of the systems of signs, offers us a criterion from which to compare the mythical actions and their axes that is consistent with the narrative-communicative parameters which conform the previously presented conceptual skeleton of the Mythopoetics. Finally, the definition of mythopoetical complexity will be specified following the n-arizations of the ludic emotion which have led to the development of the critico-ludic social persona, the most elaborated symbolic construction attained by the process of continuous rationality.

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[331] In the sense of being reducible to an arithmetization, of the possibility of reducing the syntactic system to a computational system, though not exempt from the incompleteness of the inferential systems.

Appendix

Neural Darwinism and Emotional Neural Systems.[332]

1. Neural Darwinism

Here I merely make a brief extension and illustration of the two main theories which I combined in order to explain emotions. Edelman and Tononi postulate three mechanisms to explain the generation of the adaptive behavior in neuronal populations: the mechanism of variation and selection of development, of selection based on experience, and of reentrant signaling.[333] The first of these mechanisms arises from the empirical observation that the structural diversity of the nervous system is not strictly programmed in the genetic code, but instead, it is controlled by the effect of a type of molecules called morpho-regulatory.[334] From this action results a cellular variety that will yield the formation of neural groups[335] and local circuits to which Edelman calls *primary repertories*. The selection of development leads to the formation of the characteristic neuro-anatomy of a specific species. The genes of the cells determine morpho-regulatory molecules that in turn control the movements of the cell and its adhesion to others. These actions group cells together and these cells interact in turn producing a change on the homeotic genes.[336] Although, the final development of the live organism is directly conditioned by topo-biological epigenetic processes, that is, by the processes which take place due to the localization of the cells themselves during embryonic and early post-natal periods. Once the connections of the primary repertories have been established, a second mechanism is produced in the process, in which the particular sets of neurons are dynamically selected by means of changes in the strength of the synaptic connection (although, without changing the connectivity pattern), that are conditioned by behavior and experience, a selection that leads to the formation of secondary repertories. Due to these changes, which condition the efficiency of synaptic connections, the circuits and neural groups of the secondary repertory have a higher possibility of being favored than others, if they are reaffirmed by experience. Moreover, the groups of the secondary repertories compete among each other for neurons that belong to other groups, a competition which affects the functional properties of the different neural groups. The primary repertories that are not reaffirmed lose strength in their connections. Lastly, the reentrant mechanism explains how the brain areas that emerge in evolution coordinate with each other to produce new functions. Edelman calls *mappings* to the relationships that are established between the different repertories, whether primary or secondary, and the groups of sensory cells. Brain mappings connect with the senses, but also among each other, producing perceptual and conceptual categorizations, depending on whether the connection is made with the biophysical environment or with other mappings. Thus, for example, the monkey's visual system is composed of more than thirty maps, each one with a certain degree of functional segregation (in which are regulated color, movement, etc.), and linked to others by means of parallel, recursive and reciprocal connections.[337] The functional topobiological architecture is formed, therefore, evolutionarily through mapping and categorization processes whose systemic configuration is none other than a synthesis of the processes that have led to survival. In this interaction, the perceptual and conceptual categories that are successful will be chosen.[338]

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[332] This appendix has been made with the assistance of Nur Ferrante.

[333] The description here presented follows the one made by Edelman in the cited essay of Neural Darwinism as well as the commentaries of Gerhard Weiss in *Neural Networks and Evolutionary Computation. Part II: Hybrid Approaches in the Neurosciences.* 1994. Web.

[334] Which regulate the dynamics and neural epigenetics of cellular division, adhesion, migration, death, extension and retraction. See Edelman, *Neural Darwinism: Selection and Reentrant Signaling in Higher Brain Function.* Ed. Cit. 117.

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[335] A neural group is a physiological entity formed by sets of neurons, whose number can vary from the hundreds to several thousands, which are strongly connected.

[336] Genes that alter the expression of other genes.

Reentry signals can take place not only between maps but also between more complex structures, such as the cortex, basal ganglia, and cerebellum. The schema that Edelman proposes is the following:[339]

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[337] See Edelman, Gerald M., *Bright Air, Brilliant Fire: On the Matter of the Mind.* Basic Books. New York. 1992. P.85.

[338] See George N. Reeke Jr. and Olaf Sporns, *Neural Darwinism and Selective Recognition Automata: How Selection Shapes Perceptual Categories.* Self-Organization. Emerging Properties and Learning. NATO ASI Series Volume 260. 1991. p.p. 199-208. Web.

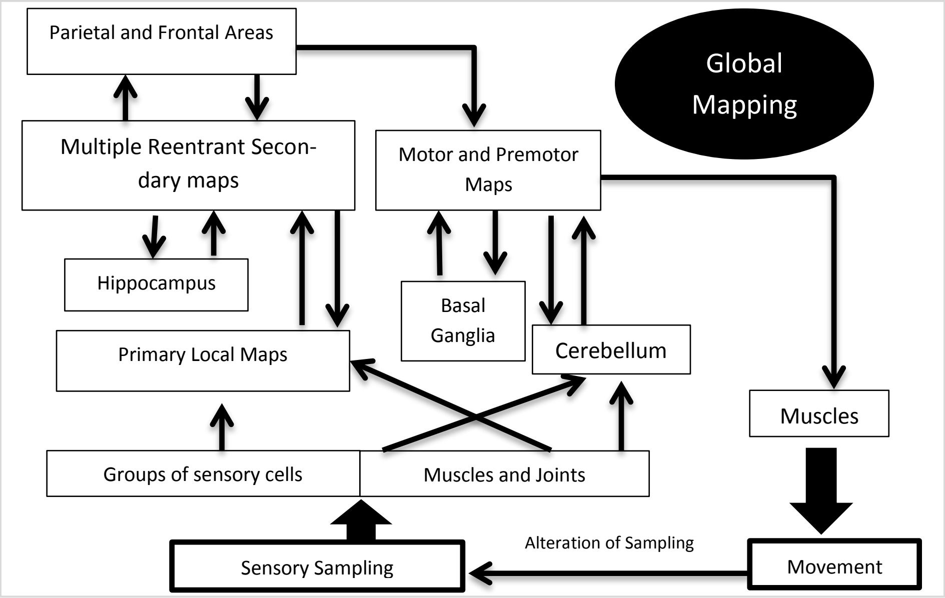

Table C.1.: Edelman’s schema of the Global Mapping.

The four fundamental systems of the global mapping are:[340]

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[339] Summary of Edelman’s exposition in *Consciousness: How Matter Becomes Imagination.* G.M. Edelman and Gioulio Tononi. Penguin Books. London. 2001. p.96.

1. The limbic system regulates appetite, sex and evolved defense patterns. It is a valuation system, that is, it assigns priorities to the different protocols of behavior depending on preceding experiences: valuation systems act by restricting the domains of the characterization to the functions that have been evolutionarily reaffirmed. Valuations are, thus, phenotypic aspects of an organism that were selected during evolution and that constrain selective somatic events, such as the synaptic changes that occur during brain development and experience.[341] This system is connected to different body organs, as well as to the endocrine system and the autonomous nervous system, and its cycles are slow, with a range that goes from seconds to months. The mappings of the system are not detailed, and are evolutionary selections connecting the internal functioning of the body, not the signals from the external world.

2. The thalamo-cortical system evolved to receive signals from the sensors and give signals to the voluntary muscles. Its temporal range is from milliseconds to seconds, although its synaptic connections suffer changes that last a lifetime. It does not contain loops, as the limbic system does, but structures of local layers highly connected with numerous reentrant connections. It evolved to receive multiple inputs from the senses.

3. The system of cortical appendixes, formed by the cerebellum, hippocampus, and basal ganglia. The cerebellum, alt-

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[340] According to Edelman, in *Consciousness*, Ed. Cit. p.p.45-46; and *Bright Air, Brilliant Fire*, Ed. Cit. p.117 and s.q.

[341] Cf. Edelman, *Consciousness.* Ed. Cit. p.p.87-89.

hough it is not required to initialize movement, plays a very important role in the temporization and smoothening of the sequence of movements. Together with the cortex, provides the basis for the categorization and production of smooth and continuous gestures. Basal ganglia are involved in movement planning and therefore, in the selection of the type and succession of movements. These nuclei couple sensory and motor responses and help with the guiding of what has to be done in accordance with a motor plan. The hippocampus, which receives impulses from almost every part of the cortex, links short term memory with long term memory. The hippocampus, the basal ganglia and the cerebellum organize the global mappings, and without their intervention memory cannot be produced adequately.

4. The nuclear system, composed of the noradrenergic *locus coeruleus*, the serotoninergic Raphe nucleus, the dopaminergic nuclei, the cholinergic and the histaminergic. All of them are connected with most of the brain areas and evolved to coordinate the spatio-temporal perception of the present and memorized movements. This present-past relationship hierarchizes responses depending on their success, that is to say, it involves a vital valuation of what is happening in the present.

2. Emotional Neural Systems.[342]

The main systems of the self-stimulation or seeking neural system are found in the lateral hypothalamic corridor, and are well marked by the trajectory of the brain's dopamine systems, especially the mesolimbic and mesocortical components which ascend from the A10 dopamine neurons, and are responsible for the correct processing of appetitive information in the frontal cortex and ventral striatum of the reptile's brain.[343]

If instead of understanding this system in terms of brain topology we do so in neurochemical terms, the emotion of seeking can be characterized by a dopamine system linked to motor neuronal stimulations, a system which is probably the *exaptation* or evolutionary functional reconversion of older neurochemical systems, the catecholamine system, based on epinephrine, responsible for metabolic activation, and the norepinephrine system, responsible for sensory activation, including dopamine, responsible for motor activation.

Aggressive frustration can be produced with the appropriate electrical stimulation on a circuit that runs from the medial amigdaloid areas, downwards, through the stria terminalis, until it reaches the medial hypothalamus and from there towards specific places of the PAG[344] of the mesencephalon, forming a hierarchical structure whose influence goes bottom-up.[345] At a neurochemical level, it has been verified that the substances which promote aggressive frustration are less numerous than those that reduce it, being found among the former substance P, glutamate and acetylcholine, although the most important neuromodulators for this emotion have not yet been found.[346]

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[342] This exposition is a schema of the main points of Panksepp's exposition in *Affective Neuroscience.* (Panksepp, Jaak, *Affective Neuroscience: The Foundations of Human and Animal Emotions.* Oxford University Press. New York. 1998.)It is a complement to what has been presented in the main text which illustrates with graphics the topobiology and the most important connections of the seven emotional systems.

[343] Cf. Panksepp. Ibid. p.54; p.p.145-157.

The mammalian brain topology of the neural system of fear includes the lateral and central areas of the amygdala, the medial and anterior hypothalamus, some specific areas of the PAG, and the caudal pontine reticular nucleus.[347] The amygdala is key within this system in vertebrates, for in it are determined the processes that result in the valuation of a threatening situation, as well as the coordination of the behavioral responses toward it and the corresponding autonomous and endocrine associated reactions. The neurochemistry of fear is partially known. The dominant thesis aims towards glutamate as the amino acid that mediates learning through fear, and which generates fear's unconditioned response, although there are other neuropeptides that experimentally have proven their influence on the increase of fearful behavior.[348]

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[344] Periaqueductal gray.

[345] That is, the aggression originated at lower areas does not critically depend on the one originated at higher areas. Cf. Panksepp. Ibid. p.p.196.

[346] Ibid. p.202-203.

[347] Ibid. p.213.

[348] Ibid. p.218. Among these, Pamksepp includes: CRF, Alfa-MSH, ACTH and CCK. GABA functions as an inhibitor of fear.

In mammals, the neural system that corresponds to the sexual emotion is different between males and females. Each one is the development of a former evolutionary system which is found in fish and reptiles, from whose neurochemical component, *vasotocin*, are derived -due a change of an amino acid- mammalian vasopressin and oxytocin.[349] Oxytocin, although found more abundantly in the feminine brain, also plays a role in male sexuality, both in sexual arousal and sexual satiety.[350] Arginine-vasopressin is present during the male's sexual arousal phase although not during orgasm, which is controlled by oxytocin, whereas in females, it is oxytocin the substance that regulates the functioning of this neural system both in courting and copulation.[351] Even though in mammals the male and female neural circuits are different, they share common areas which are receptive both to androgens and estrogens. Males have a larger preoptic area, which plays a fundamental role in their sexuality, whereas in females the ventromedial hypothalamus is the equivalent area of sexual response, nevertheless, both are more or less active in the opposite sex, as well as the periaqueductal area and the spinal cord.[352] Even though oxytocin and vasopressin brain circuits are the main substances that determine sexual emotions, these are only two neurochemical components of a longer list which is beginning to be elaborated in affective neuroscience, to which it would have to be added as well the luteinizing hormone (LH) and acetylcholine.[353]

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[349] Ibid. p.230.

[350] Ibid. p.p.230-231.

[351] Ibid. p.p.240-241.

[352] Ibid. p.p.236-237.

The mother care neural system is linked to extensive subcortical areas that include, on the one hand, the preoptic area along the dorsal route through the habenula to the brain stem, and on the other, through the hypothalamic route, the dopamine systems of the ventral tegmental area and beyond.[354]

For its part, the neural system of social emotion (or socio-organic) is found in the cingulate cortex, the periaqueductal area, the dorsomedial thalamus, the ventral septal area, the preoptic area and the nucleus of the stria terminalis, and is responsible for the stress and pain that mammals feel when they are separated from the group.[355] This socio-organic circuit is curiously situated in the same brain areas where the sexual neural circuits and the maternal emotion are also found, and is very near as well to brain areas that are directly linked to pain processing.[356]

Finally, the multiple concurrent activation of abilities involved in play makes its isolation as a system difficult, and new techniques would be required for a complete identification.[357] Thus, for instance, if damage is inflicted upon the caudate nuclei and the putamen of a rodent’s brain, the animal will not only lose all desire to play, but also its appetite as well, its curiosity, and its general willingness to move,[358] that is, it will affect also the dopamine circuit of seeking. However, it is known that the parafascicular nucleus (which also participates in pain perception) and the posterior thalamic nuclei, promote ludic behavior in animals, whereas neither the neocortex nor the cingulate cortex intervene in play desire.[359] The desire for play and amusement are reduced by all kinds of corporal unbalances, hunger, sleepiness or illness, as well as by oxytocin, opioid antagonists, or the excess of these, in fact, opioid excess reduces the activity of all the emotional systems.[360] On the other hand, play and the different forms of aggression have different neural systems, even though play can end up activating other circuits.[361]

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[353] Ibid.
[354] Ibid. p.253.
[355] Cf. Panksepp. Ibid. p.p.262-270.
[356] Ibid. p.267.
[357] Ibid. p.291.

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[358] Ibid.
[359] Ibid.
[360] Ibid. p.p.293-294.
[361] Ibid. p.286.

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